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THE ROLE OF CULTURAL FACTORS IN PARANOID PSYCHOSIS AMONG THE YORUBA TRIBE*

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INTRODUCTION

It is certainly noteworthy that, during the last few decades, whatever the contributory forces, more and more emphasis is being placed on the contention that man is a social being and that his individuality as a person is meaningful only in terms of his relations with others. Mead (1947) has shown that man as a social being is subjected "throughout his entire individual existence to systematic cultural pressures" which reinforce or intensify, elaborate or suppress his psycho-biological potentialities in a way which not only refutes the false belief in the uniformity of human behaviour but reveals also its most extreme types.

Recent trends in genetic psychiatry have pointed to the fact that the gene is no longer inviolable and "that man is not committed in detail by his biological constitution to any particular variety of behaviour". It is for this reason that, where the cultural experiences have greatly differed, attempts should be made to discover how closely related are observable personality traits and analysable cultural phenomena.

It is on this great problem of the relationship between mental and cultural processes that the author attempts to shed some light, drawing on the vast clinical and anthropological materials available in Yoruba culture most of which, however, are quite unknown to British psychiatrists.

It is also hoped that this may serve to clear the ground of certain prejudiced observations which have been very detrimental to the problem of the brain-mind relationship and to straight thinking about it; for example, Carothers's (1951) observations on "Frontal lobe function and the African". Carothers argued that "the peculiarities of primitive African mentality might also be seen as a failure of development or lack of function of the cortex *in general*, an approach which would accord with Vint's observation that 'the cortex of the native brain was found to be narrower than that of the European.'"

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The concept of epiphenomenalism, i.e. the correlation between details of brain structure and details of mental processes cannot be carried beyond a very restricted field. It is only by abstraction, permissible (on the premise of biological materialism) but dangerous to scientific thinking, that we allow *caedit questio* purely mechanistic or physical explanation of mental processes in all circumstances. While there is no reason to assume that any real injury is done to the methodological and clinical principles of scientific psychiatry, however, much of Carothers's argument and conclusion, as will be seen later, can be justifiably regarded as a *reductio ad absurdum*.

Cultural anthropologists and those psychiatrists who have been fortunate in working among peoples of different cultural institutions have laid down the hypothesis that cultural factors influence the aetiology and psychopathology of mental disorder.

We may assume that certain types of mental diseases are known in every culture but their incidence has been said to vary from one culture to another—for example, the frequency of melancholia among the Chinese in Java (Van Wulfften-Palthe quoted by Yap, 1951), the rarity of mania among the Eastern Cree (Cooper, 1934), and the relative rarity of classical manic-depressive psychosis, especially depression among some African tribes (Gordon, 1936; Carothers, 1947; Laubscher, 1937).

In still another culture a unique form of clinical picture is found, for example, Wihtiko psychosis of the Cree* and Ojibway (Cooper, 1933; Hallowell, 1934); the Malayan Amok and Lattah (Ellis, 1897; Van Loon, 1926; Yap, 1952) and the "arctic hysteria" among the Eskimo. The latter is a cultural variation of Lattah but was termed "arctic hysteria" by Kraepelin, who recognized certain common features with the Western form of hysteria. In this connection also can be mentioned the Piblokto of Peary's Eskimos (Brill, A., 1913), Imu—a psychoneurosis occurring among the Ainu, and the work of Geoffrey Tooth (1950) on the West Coast of Africa, who remarked that one is forced to the conclusion that there are real qualitative differences in the psychotic reactions of individuals with different cultural and racial backgrounds, "differences which make it impossible to fit them into the accepted nosological framework . . .".

If such is the case, and there is factual evidence that it is (O'Malley, 1914; Seligman, 1929; Dhunjibhoy, 1930; Sapir, 1932; Lopez, 1932; Faris, 1934; Hallowell, 1934; Shelley and Watson, 1936; Devereux, 1939; Demerath, 1942) the importance of cultural factors can hardly be ignored in any aetiological explanation of their clinical differences.

The hypothesis that cultural variations bear some relation to psychotic behaviour reactions is also supported by the anthropological tenet that from the fact of the close relationship between psychological process and social life the content of the mind in each cultural group is of a specialized kind (Firth, 1952). This fact has, however, been overstressed by many anthropologists, but the students of psychopathology among primitives realize that cultural factors exert their influence in addition to constitutional factors (Morris, 1951).

Paranoid psychosis has been selected for the programme of this research because, according to my clinical experience among the Yoruba tribe, it presents the most florid clinical picture and, particularly it reflects most adequately the psychic stresses which are inherent in the tribal culture.

The conclusions are, therefore, supported by practical experience and by an

* Cree-speaking people of the Western shore of James Bay, the Southern extension of Hudson Bay.

intimate acquaintance with the subject in its clinical and anthropological aspects. Yoruba was the only language used throughout this study.

It has been said that it is fair to assess the value of any new contribution to scientific theory and practice by the quality and number of problems that have emerged under its impact. Measured by this standard, the value of the theories advanced by Kraepelin, Freud, Jung, Ferenczi, Bleuler, Meyer and their respective collaborators to elucidate the concepts of paranoid psychosis is very high.

Only a few noteworthy attempts (Gordon, 1936; Shelley, 1936; Carothers, 1947; Tooth, 1950; and Yap, 1951), however, have been made to examine these general hypotheses in a large series of paranoid psychosis in other cultural environments. As far back as 1895, the meaning of culture in terms of abnormal human behaviour was emphasized (Maudsley, 1895). In *The Pathology of Mind* Maudsley laid considerable emphasis upon "the importance of a study and analysis of social environment in relation to human thought and conduct in general and the varied types of mental diseases in particular".

It is obvious that the problems which are raised are old enough, but there is no immediate sign of their solution. The concepts of paranoid psychosis in other cultures constitute a major challenge to psychological theory and practice. At the present stage of our knowledge there is no better approach than to study the gradual historical evolution of the psychiatric concepts and to deepen our knowledge of comparative psychopathology by further research.

The history of medicine has shown that:

"Medicine as it is known and taught today is largely concerned with disease in the civilized white man. When the world is considered as a whole the white men are a minority group, and civilized man is a recent phenomenon in history. The study of little-known races living in primitive environments in medically unexplored territory can be expected to reveal manifestations of disease, if not new diseases, which may well prove important in the general advance of medical knowledge . . . It is especially important that such work should be done now, since primitive ways of life and even the people themselves are in danger of dying out."
—(B.M.J., 1953.)

The study of mental disorders among primitive peoples is a comparatively new field for medical research but it should be realized that so many of the so-called primitive peoples studied today are in varying stages of acculturation. This is especially true of the Yoruba tribe in Nigeria. The literature on the subject is extremely inadequate and in some cases the clinical conclusions were founded on the treacherous sands of unscientific methodology. Paradoxically, others justify their inferences (which often extend beyond the range of observation) by appealing to "our age's gods—science and scientific objectivity".

Objectivity can sometimes become an obstacle in the search for truth. This has happened in varying degrees with some of the accounts given by modern exponents of the subject of "race" and disease. At their worst (e.g. Laubscher, 1937; Schottky, 1937; Carothers, 1951), they have been but glorified pseudo-scientific novels or anecdotes with a subtle racial bias; at their best (e.g. Devereux, 1939; Carothers, 1953), they are abridged encyclopedias of misleading information and ingenious systems of working hypotheses, useful for the guidance of research, but containing so many obvious gaps and inconsistencies, giving rise to so many unanswerable questions, that they can no longer be seriously presented as valid observations of scientific merit.

Our knowledge of primitive cultures which could have thrown considerable light on scientific consideration has been greatly hampered not so much by ignorance of them, but by knowing so much that is not strictly true. This difficulty is even more pronounced in the evaluation of certain psychological

constellations and their relevance to the problems of personality in health and disease in other cultures (Dennett, 1906; Linton, 1936, 1945; Faris, 1937; Landis, 1937; Nadel, 1937a, 1951).

Modern investigators should give consideration not only to variations in personalities, but to the different types of cultural values which personality variations may imply. This study has revealed the fact that where there is a "racial" group so culturally different and historically isolated from Western culture we have the right to expect unfamiliar responses to the problems of social life; and the methods of approach will have to be modified accordingly.

The proper evaluation of abnormal human behaviour outside the framework of socio-cultural pattern is still far in the future. When data are available in comparative psychiatry, the resulting nosological categories or reaction-types will probably be quite unlike the culturally conditioned, highly elaborated psychoses such as those that are described, for instance, under the categories of schizophrenia and manic-depressive psychoses in Western culture (Benedict, R., 1934).

Here, then, on the basis of personal observation and reflection on clinical materials in the light of advances in our knowledge, I have in this work attempted to show the influence of cultural factors insofar as they determine the peculiar *form* and *content* of this mental disorder. These cultural forces, which are also observed to enter into the aetiology and psychopathology of this mental illness as it occurs in the Yoruba tribe of Nigeria, do not give rise to a true occurrence of a "peculiar native psychosis" inexplicable by common psychodynamic formulations (using this latter term in the widest sense possible).

This finding does not support Carothers's (1951) important hypothesis "that African backwardness and the occurrence of 'primitive' psychosis can well be linked with frontal idleness". On the basis of deeper psychological determinants, this investigation has shown that the aphorism, "the nature of men is identical; what divides them is their custom", is a valid statement even at the level of psychotic regression (cf. J. T. MacCurdy, 1946, p. 66).

This work has also provided the opportunity for a critical evaluation of some of the psychiatric concepts and interpretations (within the thesis's terms of reference) advanced to explain psychological manifestations of individuals conditioned to the cultural patterns of Western civilization (Herkovits, 1934).

A. THE HISTORY OF THE YORUBA TRIBE AND ITS SOCIAL ANTHROPOLOGICAL BACKGROUND, WITH A SPECIAL NOTE ON THE BEGINNING OF EUROPEAN INFLUENCE

The Yoruba occupy most of the region of South-western Nigeria, extending from the Guinea Coast to the western boundary of the Niger delta and bounded on the west by Dahomey and French Togoland. The territory extends over 200 miles inland to Lokoja, where the rivers Niger and Benue join.

The principal members of the tribal group are the Oyo, Egba, Ife, Ilesha and Ijebu. The most apparent common denominator is the language rather than the culture. However, for practical purposes, the cultural pattern is homogeneous, at least as far as the psychological attitudes to belief in magic, superstitions, rituals, and reactions to cultural conflicts and psychic stresses resulting from supernaturalism are concerned.

Racially, the Yoruba form a greater part of the "True Negroes"—an ethnic group of the African Negroids (Ashley Montague, 1951). The population totals three-and-a-half million people who were until recently mainly agricultural.

Today a large proportion have turned to commerce and trading, but on the whole the Yoruba country still remains a country of peasant farmers.

Culturally, the Yoruba live in a momentous time. They constitute one of the most progressive tribes on the West Coast of Africa, but even so the Yoruba are bewildered at the speed at which they are losing all vestiges of African traditions and their once-cherished age-old cultural heritage. They are faced with the decision of either fighting a rearguard action in order to preserve the most valuable and satisfying elements of their social institutions, or succumbing to the present cultural conflicts. Cattell (1939) has stated that cultural conflicts are creative as well as destructive.

The ancient history of this tribe, as might be expected, is lost in the mists of legend and mythological concepts. Apart from the little accurate historical data that is now available, Yoruba mythology reveals, for the purpose of this work, sufficient empirical evidence to allow certain psychological conclusions to be drawn. Tribal tradition holds that all Yoruba originated from the town of Ife, and claim the Oni of Ife as their ritual leader.

Yoruba mythology is, as a rule, tribal history handed down from generation to generation by word of mouth. It represents the experiences of the whole tribal group; the mythological world of their ancestors is a reality of immense importance. The mythological approach enables us to view traditional, primitive religious concepts in an evolutionary perspective. It also reveals the building up of a traditional system of ideas, that is, how the tribes have learnt to appease the angry gods and even win their kindly support and approval by the institution of sacrifices. Thus the unsophisticated and undifferentiated mind began to react to the intricacies of his social environment and evolved some traditional ceremonies for manipulating the powers of the unknown world. The psychological implications of the religious sacrifices as powerful cultural forces in this tribe are of considerable interest.

The relevance of Yoruba mythology to the present study can fully be appreciated in Reik's (1931) description of myth as older than religion and as one of the oldest wish-compensations of mankind in its eternal struggle with external and internal forces. According to his view, its origin can perhaps be traced back to the time when all aspects of human life were still pervaded by animism and its usefulness is best illustrated in its importance for our understanding of the first psychological conflicts of primitive people.

The outstanding works of Freud, Jung, and Roheim are especially relevant here. In order to appreciate the significance of or to interpret specialized thought-content, it is essential to know through what myths, what legends, what succession of traditional customs it has come to its place within the particular cultural group which is attracting our attention. This procedure would only be unnecessary if they were, in fact, certain original and perfectly universal thought-contents demonstrable in all cultures.

European contact with West Africa started from the 15th century; it has been reported that the Portuguese had been in touch with the kingdom of Benin as early as 1472, dealing in ivory and slaves. Western impact did not begin to be felt in Yorubaland until the advent of missionary work of both the Church Missionary and the Methodist Missionary Societies about 1842. The discovery of America and the colonization of the West Indies by Spain led to the tragedies of slavery in the vast country of Yorubaland.

Long before this it was the great Mohammedan Emirs of the North, with the help of the "Arab" traders, who raided the pagan tribes scattered in the forests. The powerful Nupe and Yoruba chiefs took this opportunity to enrich

themselves and, consequently, strifes and inter-tribal disorder took a grip on the country. Gradually Lagos became an important factor in the contact with the British. It was conquered in 1851 and became an important centre of commerce after the bridgeheads established by the slavers had been wiped out. Penetration into the interior of Nigeria was first confined to the route of the great river Niger "which for so many centuries was known only by tradition and romance".

By 1900 the British Protectorate was well established over the whole of the country. The conspicuous but unfortunate role the continent of Africa had played in the history of the Western world as the "cultural melting pot of the Old World—the place where countless influences came together and mingled to branch anew or lie dormant but, in every case, taking a new turn"—can now be appreciated fully by the student of history, especially by those who regard the historical approach as essential for the study and analysis of contact situation and behavioural manifestations.

Acculturation processes have affected the tribal communities to a varying degree but many aspects of aboriginal life are still flourishing in considerable strength. In the attempt to study the psychological realities of today which either result from, or are connected with, the European influence within our term of reference, the field of psychopathology offers a new approach.

B. CULTURAL FACTORS AND "AFRICAN MENTALITY"

Yoruba culture, from which have evolved certain mode of thinking, art of living and basic attitudes, does not differ materially from most primitive cultures. From the preceding account of Yoruba mythology we see the gradual evolution of primitive thinking. The basis of mythical, and therefore primitive, thinking are not logically formulated ideas but emotions which also accompany and colour ideas. In accordance with tribal custom, social authority is the source of reality and truth.

Nothing is more paradoxical than the immense interest in, and the immense ignorance of, primitive cultural institutions and their psychological implications, which so surprisingly co-exist in our mind today. Throughout the primitive world the most cherished traditional beliefs are being scrutinized, while no institution, however benign, escapes the fire of criticism. Many authors (for example, Westermann, 1939; Ritchie, 1943; Silberman, 1951; Carothers, 1947, 1951, 1953) have described African culture and, therefore, personality formation in various ways and from different angles, expressing opinions and expounding theories under the jargon of technical scholarship and effectively insulated from scientific criticism. Carothers's (1951) picture of the African personality is one of an illogical blend of low intellect and immoral qualities, tainted with primitive passions and perversities.

Carothers (1951) argued that "normal African mentality closely resembles the mentality of a section of the European population which is commonly entitled psychopathic or sociopathic". He continued, "Except insofar as the African's ritual training mitigates some of the more socially flagrant symptoms (e.g. rudeness and tactlessness), and except that the African shows no lack of verbal ability or of phantasy, the resemblance of the leucotomized European patient to the primitive African is, in many cases, *complete*" (author's italics). He also stated that "for the most part Bantu Africans are very happy-go-lucky and inaggressive and would fall into the class of psychopaths called, 'Inadequate.'"

In spite of isolating these phrases from their normal contexts, they serve

as a good example of one of those attempts by some authors who, confronted with the baffling problems of the incomprehensible, adopt the popular procedure of making sweeping generalizations behind a veritable smokescreen of technical terms, involved abstractions and semantic confusion.

After "a study of African reliability", Carothers (1951) drew up a list of African character traits and concluded, "The striking thing, however, is that they would only occur frequently in Western European civilization in persons who would be considered thoroughly irresponsible, whereas Africans who do not frequently default in ways like these are rather exceptional people." We may agree about the value of this feature of Carothers's work without accepting his sharp distinction between Africans and civilized men. His evidence is incomplete and anecdotal. Often the fanatical racists forget the fact that civilized man, in spite of his more recently evolved mental and moral qualities, has failed to prove yet that he can remain "permanently" civilized.

Others have depicted the African as an irrational, passionate, restless creature, who naturally loves to hunt, wander, brawl, play, dance and sing, take risks and above all has weakly developed ego-consciousness. Ritchie (1943) has stated that

"because of the long period of unbroken indulgence as a nursling, ended by an unbearably sudden and severe weaning, the African has two diametrically opposite convictions about himself, reflected in an equivalent unbalanced attitude to the world. At one level of his mind he is omnipotent, at another he feels absolutely impotent, while the world is divided into two forces—a benevolent power which would give him everything for nothing, and a malevolent which would deprive him of even life itself. As the world of reality denies his omnipotence, he is thrown back on the opposite conviction and remains helpless and psychically dependent on parents or parent surrogates all his days. His own individual personality, with all its latent powers, is never liberated and brought under conscious rational control, and self-realization is thus unknown to him."

It is thus obvious that the modern observers, limited to meagre stocks of fact-data, usually mix their scientific observations with philosophical, psychological or anatomical speculations which tend to vitiate their conclusions.

There is no such thing as "African culture" and therefore "African mentality". Even if we admit that "human societies are never alone", diversity of human cultures in Africa has been emphasized by many competent anthropologists. This diversity is brought about much more by the relations between the various groups and, to a less extent, by the isolation between the groups.

There is no evidence, however, to support the view that Yoruba cultural institutions are significantly different from those of the other African tribes. A review of the literature on this subject reveals the fact that there are important points of similarity. Insofar as his personality structure is influenced by the cultural pattern, a rural (non-literate) Yoruba, for practical purposes, is a fair representative of the primitive African.

African cultural institutions may be different in certain respects. In one respect, they may lack the beauty of the Greek, the durability of the Chinese, the profound mysticism of the Hindu, and the effective knowledge of scientific facts and control over natural forces acquired by the West; in another, the functional and psychological significance of cultural factors may show considerable variation, but these cultural differences neither take origin from, nor have any correlation with, the biological differences between races.

It has been shown by many anthropologists that the naïve mind of the primitive man is not capable of thinking consistently and particularly not capable of comprehending the concept of a general law or of inevitable causality and necessity.

Primitive people are often accused of logical fallacy—so-called “pre-logical” type of primitive mentality (Lévy-Bruhl, 1926). In Yoruba culture, for example, if a man finds the hair or a nail belonging to, or even a piece of material which has been worn by, an enemy, he believes he has only to “use” them in order to bring about his enemy’s death or to injure him. In this mode of thinking, there may be said to be a magical or mystical denial of the concept of causality and of the reality of their spatial and temporal relations. Lévy-Bruhl, however, omits the fact that “pre-logical” mentality occurs in both civilized and primitives, though to the civilized it is, of course, much more in evidence in primitives.

If it is right to believe that the magical period in the history of mankind was the “pre-causal” one, then primitive man’s magic is no sign of a “pre-logical” mentality, as Lévy-Bruhl believes, but of a “pre-causal” (that is, pre-scientific) thinking. Strauss (1953) in *Reason and Unreason in Psychological Medicine* has stated that

“Even primitive magic relies on the necessity of establishing a causal sequence, especially if anything has to be *done* (author’s italics), seeing that man is a rational animal. For example, a tribal rainmaker must have the inner conviction that, when he pours a bowl of water on the ground with the appropriate incantation, the next rainfall has a direct causal relationship with his magical ceremony. A rainmaker who is not so convinced is a bad rainmaker. We shall see later that a psychotherapist—of any complexion—who doubts the validity of his own particular system is a bad psychotherapist. Magic develops into science when it can be shown that the chain of cause and effect is false; and this occurs more often as the result of trial and error (the experimental method) than through pure ratiocination. In this way alchemy, which according to Jung, started as a symbolic substitute-religious discipline, developed inevitably into chemistry.”

Alfred Storch (1924), Schmideberg (1930) and Burstin (1935) have shown that the mystical thinking of primitive man (as exemplified in this culture) is analogous to that of the schizophrenic. This is exemplified in his lack of causal thinking, “especially in his magical taboos, his unshakeable belief in the omnipotence of thought and in the supernatural efficacy of physical phenomenon and further, in his lack of any sharply delimited ego-feeling”. With regard to these analogies, the psychoanalytical school asserts so much and so positively, but it would be a dangerous suggestion for scientific orientation to think that being different is being pathological. In addition, to this apparent and superficial analogies are often drawn whereas the underlying differences in their genesis are often ignored.

The Yoruba, in common with most primitive peoples, regard nature as an important part of the society. This implies a social and not a mystical association. “Reality in the Western world,” according to Brelsford (1935), “has gone the way of attempting to master things; reality for the African is found in the region of the soul—not in the mastery of self or outer things, but in the acceptance of a life of acquiescence with beings and essences on a spiritual scale. In this fashion only is the native mystic. Not because of any pre-logical function of mind but merely because he is the possessor of a type of knowledge that teaches that reality consists in the relation not of men with things, *but of men with other men, and of all men with spirits*” (my own italics). The cultural machinery, which lays great emphasis on the perceptual world of the individual in this culture, conditions the tribesman to a psychological attitude with which he refers the sensations, pleasures, pains he experiences to something outside himself.

Thus he formulates a naïve psychological and epistemological attitude—a way of comprehending his social environment by identifying himself with his life soul (the “*élan vital*” of Bergson) even to a point of confusing its spatial

relationship by regarding it as an external force. This conception of the world is pre-determined by a confused distinction between the ego and the non-ego (the external world), between the subject and the object of cognition. The soul, according to native concept, has a quality which is not only phenomenological but largely existential.

A consideration of the predominance of emotional component, with its function, in primitive culture is extremely important for an understanding of primitive modes of thinking and therefore of the peculiarity of resulting psychological manifestations.

This work among the Yoruba tribe of Nigeria has shown that in practice it is not always possible to delineate confidently where normal primitive beliefs cease and paranoid psychosis begins. The differentiation is only possible after a thorough assessment of the clinical picture, social setting, and exhaustive investigation of the complex-determined factors in the history of individual cases.

The importance of this cannot be over-emphasized, especially in a culture where foreign observers may rashly postulate that which is assumed to be self-evident, but which in reality is a product of confused thinking. Thus Laubscher (1937), who conducted a clinical study of mental diseases occurring among the South African Pagan Natives (Tembu tribe), regarded witchcraft as a phase of schizophrenia and concluded that "a study of the histories of a few witches bore ample evidence that they were psychotic persons suffering from schizophrenia".

In Yoruba cultural environment the general disease concept embraces both mental and physical diseases. This clinical enquiry shows that, as a result of the lack of awareness of causal relations, especially with regard to soma and psyche and complicated by the conception of soul, 95 per cent. of the psychiatric cases studied (both in England and in Nigeria) in this work put considerable emphasis upon bodily complaints, especially in the early phase of the illness.

Psychotic patients in other cultural settings, for example, the West, may manifest the same degree of unusual pre-occupation with somatic complaints at the outset or during the course of their illness. In the Yoruba patients studied, these symptoms, however, occurred with such frequency in individual cases that they significantly contributed to the clinical picture.

The same degree of somatic complaints in connection with mental illness among the Tembu has been observed by Laubscher (1937). He writes, "Hypochondriacal narcissistic states are quite common, all disturbances in the psychomotor sphere are attributed to stomach-ache, headache and bodily pains . . . It has almost become a conditioned pattern of formulating all symptoms . . ." In contrast to this finding is Tooth's (1950) observation in the Gold Coast: "The rarity of hypochondriacal delusions in all forms of psychosis was noteworthy." This observation may be due to the fact recorded by Tooth that "most of those seen were in a subacute or chronic state and the form of the psychosis was masked by the degree of social adjustment the individual had achieved. In over two-thirds, a stormy onset had been followed by a simple regression to a more childish pattern of living."

The complex mental structure of the Yoruba in relation to their culture has been the main theme of this section. The limitations of this correlation between details of cultural forces and those of mental processes are obvious; Sapir (1932) has warned us that culture varies infinitely. "No doubt there are cultural patterns which tend to be universal," he explained, "not only in form but in psychological significance, but it is very easy to be mistaken in these matters and to impute equivalences of meaning which do not truly exist."

With this reservation in mind, this work has established a firm relationship between the elements of cultural forces and those of mental processes by demonstrating that among the non-literate ("bush") Yoruba tribe the *form* and *content* of paranoid schizophrenia is culturally determined; while the picture of the paranoid schizophrenia occurring in the literate (Westernized) section of the tribe is, in large measure, identical with that found in Europeans.

INTRODUCTION TO FIELD OF INVESTIGATION

The main purpose of this work, therefore, was to determine the role of cultural factors in the aetiology and psychopathology and clinical manifestation of paranoid psychosis as it occurs in the Yoruba-tribe of Nigeria. To this end, a considerable length of time was devoted to a thorough study of the most relevant Yoruba cultural institutions in a restricted area where the author had spent most part of his youth and has had intimate contact with the people.

Clinical observations were based entirely on the manifestations of paranoid psychosis in twenty Yoruba patients selected for detailed study in Nigeria (1950-51), none of whom was above the age of 36 years. Ten of these were from entirely rural areas and had had very little prolonged contact with the Europeans or Westernized Africans. These comprised the non-literate (rural) group, two of whom were criminal paranoid psychotics admitted to the hospital from their villages, and two who were sent in because they became a nuisance. All four were of recent duration. The remaining six were observed in their homes in Abeokuta Province—the subtribal group to which the observer belongs. Three had participated fully in several native religious cults, rites and ceremonies.

The remaining ten patients were urbanized and Westernized to a considerable degree. Five of these were observed in their homes, while the remaining five were hospitalized.

Similarly ten students were selected and studied in England (mostly in the London area) between June, 1952, and December, 1953. Most of these were private students involved in fairly long courses ranging from nursing to medicine. Their ages were between 22 and 36 years. The clinical research was carried out with the close collaboration of the Liaison Officers (for the Nigerian Students in England) at the Colonial Office, London, where all private files dealing with individual students—family background, tribe, finances, social life and other relevant matters—were made available for thorough scrutiny in conjunction with the clinical picture.

The background of the students exhibited important variations, but marked similarities existed.

A brief sociological study was made of the colonial students' life in London, with emphasis on the change from accustomed mores, the new competition and complexity of city life in London, and the humiliation of racial prejudice and colour discriminations. Several interviews took place between the author and a number of Yoruba students who had some difficulty in adjusting themselves and particular attention was paid to students whose life in England necessitated a greater degree of interpersonal relations, for example, nurses, teachers, and medical students.

The most important single factor revealed here was the high correlation between previous maladjustment due to various environmental stresses and the subsequent development of paranoid psychosis. Some of those who showed minor degrees of maladjustment only manifested, at some period, transient paranoid ideas of sufficient intensity to be described as follows:

"Was never admitted to a mental hospital but was labouring under delusions and convinced that Mr. J. and myself had concocted a plot to murder him. He still writes violent letters from Nigeria."

"Was never admitted but very strange and sometimes violent. Has ideas that he was being persecuted. Now working satisfactorily in Nigeria."

Eight members of this group (who had already been repatriated to Nigeria) were followed up by letters to their families. Two made a fairly good social recovery and the remaining six finally broke down after a varying period of two to six months on returning to Nigeria. Similarly, clinical records of six Yoruba paranoid schizophrenics were requested from a number of mental hospitals in England and examined. These patients were never seen by the author, but had been admitted to various mental hospitals in the south of England within the last six years and had been diagnosed by British psychiatrists. The selection of the records was made from the clinical reports sent to the Colonial Office. The average age of this group was 30.

The selection of cases of paranoid psychosis was made purely on an empirical basis and, within the terms of reference of this work, embraced a fairly wide group of clinical entities, such as paranoid schizophrenia and certain ill-defined clinical states. In this latter group, personality deterioration was less pronounced than in the paranoid schizophrenic group, and it is also characterized by the development of more highly elaborated hallucinatory features, usually but not exclusively auditory. In certain respects, there were similarities between this group and Kraepelin's paraphrenia.

Organic paranoid psychoses, for example, trypanosomiasis, cerebral malaria, and other toxic-infective conditions, cerebral lues, cerebral cysticercosis, etc., were excluded from the body of the clinical enquiry but were considered together in the differential diagnosis.*

On the basis of the above criteria, the group with paraphrenic features lies at one end of the scale of a psychopathological continuum and paranoid schizophrenia at the other. It was, however, discovered in personal practice that among the Yoruba tribe the two clinical groups approximate so closely and tend to merge into each other that at times differentiation is almost impossible. This clinical formulation agrees with Noyes's (1953) experience in that paranoid psychoses, when broadly considered, can be regarded as constituting a continuous transition with almost imperceptible gradations.

NOTES ON CLINICAL MANIFESTATIONS OF PARANOID PSYCHOSIS IN LITERATE (WESTERNIZED) AND NON-LITERATE (PRIMITIVE) YORUBAS

It should be re-emphasized that "culture" and not "race" is the dominant theme in this work. While the concept of race is a biological one, culture, strictly speaking, implies environment but in its totality. The racial concept is based on the assumption that genetically determined mental differences do exist between different races but the fact should be stressed that, in the light of our present knowledge, while the range and levels of innate mental capacities between races have not been proved to exceed those that are usually encountered in individuals of the same race, there is no evidence to support the view that psychological differences between groups are racially determined.

Therefore, this enquiry is based on the hypothesis that mental traits (actual and potential) might be conceived as cultural emergents and thus become objects of scientific study and comparison.

This work has revealed that there are important qualitative differences in

* Paranoid illnesses appearing as part of other psychoses were also excluded from this study.

the psychotic reactions of these two sub-cultural groups. The clinical differences elicited are highly significant inasmuch as they influence the diagnosis, severity of clinical manifestation, and prognosis of the mental disorder under consideration, and there seems no reason to doubt that the observed differences have their origin in the prevailing superstitions, customs, and mythological concepts (that is, they are culturally predetermined).

Paranoid psychosis in the non-literate (rural) tribal group manifests some features which are apt to be indefinite, transitory and multiphasic. In some of these patients, this mental disorder genetically resembles a hypothetical mental disease lying midway between psychotic and psychoneurotic illnesses in Euro-American cultures.

Clinically, it is essentially atypical in its form, when compared with that of the literate tribal group, and, in the majority of cases, it closely simulates the picture of organic confusional psychosis that is usually found in Europeans and Westernized Africans. In most cases, a peculiar complex of symptoms (anxiety, repeated confusional attacks, absences, automatisms) may be prominent, though transitory. The significance of this symptom-complex will be discussed later.

The cultural pattern to which the primitive Yoruba belongs, determines not only the nature of his psychic content, as manifested by the forms in which his delusions are cast, but also affects the particular *form* of that mental disorder insofar as its structure is involved. Whether this change in the structure is reversible or irreversible is important since an irreversible structural change may imply a unique form of disorder peculiar to this culture. The present observation suggests that the change in the structure of the psychosis is a reversible one. Paranoid psychosis in the Westernized (literate) group of the tribe, on the other hand, does not differ qualitatively from that which is seen in European culture.

The differences in the patterns of clinical response (with both quality and quantity of the symptom-complex as determining factors) between the two sub-cultural groups of this tribe are due to certain features of the psychosis. In order to group together these characteristics for descriptive purposes, I propose to adopt Birnbaum's terminology. Karl Birnbaum in his *Struktur-analyse* coined the word "pathoplastic" for those factors which contribute to the clinical picture in individual cases or groups of cases and which are attributable to cultural and other influences tending to modify the basic manifestations of mental disorders (i.e. these pathoplastic factors are shaping factors).

The responses or activities which come into play are extraordinarily complex and their interrelations are manifold, but they are produced or rule, in a way which defies any attempt at interpretation. This symptom-complex which, in the primitive group, is superimposed upon the fundamental features of paranoid psychosis and alters its structure, may well be due to the simplicity and naïveté of the psychic apparatus of the rural tribe. This implies a fairly uniform "collective unconscious" (Jung, 1917), with its undifferentiated archetypated contents. It is these primordial forms of thought and feeling of the unsophistical tribe which determine the baffling uniformity and strangeness of their psychological manifestations.

This is not surprising. It has been shown that ancient civilization constructed innumerable gods as projections of the wish, and in the swing between the illusions and delusions of phantasy to the efforts at controlling reality of natural forces, the wide history of mankind's behaviour records countless steps between the extreme conceptions.

This symptom-complex consists of anxiety state (pseudo-running amok), neurotic depression, vague hypochondriacal symptoms, magico-mystical (bizarre) projection symptoms, episodic twilight or confusional states, atypical depersonalization phenomenon, emotional lability and retrospective falsification of hallucinatory experiences. These are usually present in varying degrees and in various combinations in individual cases.

In the active stage of the illness these pathoplastic factors, which are cultural precipitates, tend to be multiple, but as the case progresses the quantity is reduced. Some of these are apt to be paroxysmal in the acute stage, only to assume an episodic nature as the case graduates towards chronicity or as soon as the acute stage is passed. It is possible that this fact is responsible for the multiplicity of its phases. On the basis of these qualities it is possible to differentiate sharply between the two groups of psychotic patterns of reaction.

These culturally-conditioned contributory factors are found to be much greater in quality and quantity in the cases that were under hospital care than in those observed in the rural area. The cases under home care, however, deteriorated much more readily than those that were hospitalized. If this observation can be countenanced at all, one may therefore assume that the presence of some pathoplastic traits is a pathological attempt at restitution, that is, essentially reparative in nature. While this assumption may be true to a certain extent, the pronounced degree of personality disintegration in the rural group might partly be due to other factors (for example, lack of general medical attention and of institutional life).

An account will now be given below of individual symptoms from each of the groups, with a note on possible pathogenic and pathoplastic factors. One or two cases will be referred to in respect of each form of manifestation.

(a) *Delusions*

Delusions of persecution figure prominently in both groups. Delusions of grandeur are rare in the non-literate group in contrast to the expansive ideas of noble birth with continual self overvaluation, and extravagant themes which one frequently encounters in the urban or literate group.

In the rural non-literate Africans in this tribe, the delusional contents are often centred around the concepts of supernaturalism and ancestral cults, while in the literate African, hypochondriacal delusions, especially in the early stages, seem to dominate the picture. On the whole, in both groups, the ways the delusions are cast throw some light on the tribal interpretation of nature in the environment. The most important finding here is the readiness with which most of the members of the literate group, even the most fervent Christians, regress in their delusions to super-naturalism or magico-mystical influences. This regression is usually transient and often these delusions in the primitive group, based on the concept of supernaturalism, lack the tenacity and conviction that are often encountered in similar delusions of the primitive group. The same observation has been made among the American Negroes (Acherman, 1938).

The rarity of delusions of grandeur is characteristic and this is of cultural origin. Bleuler (1924) has observed that "certain ideas of persecution and grandeur are only possible in definite strivings and in definite characterological relations to the environment . . .". Yoruba culture demands total allegiance to ancestral cults and nether world gods, and it is this submissive attitude which seems to influence their choice of delusion.

Due to the influence of pathoplastic factors, especially episodic confusional

states and excitement, systematization is usually vague in most of the non-literate (rural) cases.

(b) *Hallucinations*

The observations are equally true of hallucinations in the non-literate group. There are, however, one or two features which are of importance clinically: hallucinations tend to be transitory, predominantly auditory and ill-defined.

Temporal, spatial and causal relations are meanings we read into sense-impressions we receive. There are, however, many other forms of meaning (meanings which are culturally determined) which, in similar fashion, we read into or add to different perceptions. In Yoruba culture one is never struck by the conventional meaning of a word, but rather great emphasis is laid on the whole complex meaning of the situation, the complex of emotional relations between man and man. Verbalization is the most predominant form of communication of primitive African, hence the cultural emphasis on auditory sense-impressions and their symbolization.

The other important observation is the ability for retrospective falsification of hallucinatory experiences. This observation was present in about 40 per cent. of the rural cases and in about 10 per cent. of the cases it was associated with confusional states.

(c) *Episodic Confusional States, Incoherence, and Emotional Lability*

One or more of these symptoms is invariably present and it is this constant feature of the clinical picture of paranoid psychosis in the non-literate Yoruba tribe which distinguishes it from that which occurs in the literate tribesman.

It is not uncommon for marked emotional fluctuations in normal and diseased persons in any culture to lead to affective confusion at some time or other. This, however, does not usually assume a definite pattern. During the twilight state which accompanies this psychosis in the non-literate Yoruba, there is much more profound confusion of thought process, disturbance of association, falsification of the situation by illusions, hallucinations, and depersonalization phenomena. The most constant content of this state is that of (paranoid) anxiety. During one of these confusional outbursts, one of the cases observed had anxious and hostile illusions which provoked him to kill his mother-in-law.

This clinical feature has also been noticed by Shelley and Watson (1936) and Carothers (1947), in different parts of Africa which have similar cultures.

Because of the African's (Yoruba's) cultural environment, intellectual and affective factors are closely interwoven (that is, a form of autoplasmic adaptation), but the affective sector predominates and it dominates his life: his interpretation of reality is not in relation to its temporal environment but of men with other men, and of all men with the supernatural. This is the most important single cultural factor which conditions the evolution of paranoid psychosis and its reaction types between the two groups.

If one attempts to relate this syndrome, consisting of extreme affective disinhibition associated with cloudiness of consciousness and incoherence of thinking, to the syndrome known in clinical psychiatry, one will have to think of hysterical and epileptic manifestations, but in none of the cases observed had there been any state of epilepsy.

Bleuler was one of the earliest authors to notice the clinical significance of "psychically determined excitements, or twilight states" in schizophrenia.

He further observed that they may not be "directly connected with the process of the disease, but are only transient reactions of the diseased psyche to certain stimuli".

(d) *Anxiety State*

This condition may be an important component of, or an underlying factor in, the confusional or twilight state described above, or may exist alone when it is usually seen as a precursor of the psychosis. Anxiety state as a concomitant of some other psychiatric conditions may occur in any culture, but the forms it takes, as already pointed out under (c), is culturally determined.

Anxiety is almost invariably interpreted as the result of a bewitchment which constitutes a threat to life. Thus psychogenic foci often excite activity of a kind (as pointed out above). In a small proportion of cases, this anxiety state has only a taint of hypochondriacal features. In the literate group, on the contrary, the anxiety state (which usually precedes the psychosis) shows very marked hypochondriacal features, while the "action" component (that is, frenzied fury and homicidal tendencies) is conspicuously absent.

In both groups the anxiety may persist in the acute stage, but is usually absent when the mental illness becomes well-established in the non-literate group, with the exception of when it is present as a component part of twilight state. In the episodic twilight state or recurrent confusional state that dominates the clinical picture of the psychosis in the rural tribesman, anxiety is likewise recurrent or episodic.

(e) *Hysterical Conversion Symptoms*

One patient (among the rural, non-literate group), after a month in hospital, developed hysterical aphonia (long after appearing in Court). A few days previously he had been preoccupied with answering the ever-present persecutory voices. Another patient, who at one time put cotton wool in his ears, finally developed hysterical deafness; while hysterical conversion symptoms developed, with subsequent partial recovery, in one other patient. These were the only three cases in whom the hysterical nature of the affection could be adequately appraised. In the literate group, as a whole, no hysterical symptoms were elicited.

Thus the clinical manifestations of paranoid psychosis in the non-literate Yoruba are ill-defined, punctuated with multiple pathoplastic features and, on the whole, the picture of mental confusion being the most prominent trait. Hence its form is essentially amorphous.

It should be stressed that these pathoplastic factors exist only in addition to thought disorder, passivity feelings, affective disturbances, disturbed association of ideas and other symptoms which are varying aspects of the fundamental schizophrenic disorder, common to both groups. In the early stages of psychotic process in the non-literate (rural) group psychoneurotic-like symptoms of an ill-assorted nature are going on at the same time.

The following four cases selected from the primitive group will be dealt with in detail to illustrate some of the atypical features mentioned above.

CASE 1

Summary. Paranoid psychosis of insidious onset. Longstanding self-reference tendencies and vague depersonalization symptom, consequent upon an incident with a very strong affective value.

Pre-psychotic personality was mixed with comparatively schizoid traits. Mixed constitutional make-up with asthenic features. Family history was clear of mental disease.

Initial stage of excitement, confusion and auditory hallucinations. Few pathoplastic traits

and multiphasic changes. Examination under anaesthetics seemed to have uncovered the schizophrenic layer, which was revealed for a comparatively short time before being screened once more by recurrent confusional attacks.

The most significant and relevant physical finding was a uterine fibroid which reinforced her wish-fulfilling delusions (that she was pregnant, etc.). Rapid deterioration.

J.D., a Yoruba-woman aged 35, married with no children, was seen at Owode, near Abeokuta, in 1951. She was the first wife (with two co-wives) of a prosperous local farmer who dealt in kola nuts.

She was quite well until the end of November, 1951, when she suddenly started to show restlessness and excitement and began to laugh a great deal. The husband sent for her relatives, who diagnosed a "brainstorm" due to the "evil work of one of the co-wives". She was removed to one of the huts where she was seen by a native medicine man who, after a long ritual, diagnosed the patient to be the "offender", that is, that the patient had previously used a powerful magic against somebody whose defences were strong and the effect of the rebound was supposed to be the cause of her illness. The native medicine man left after a week of treatment. (It is not unusual for the native medicine men to tactfully manoeuvre themselves out of the picture in cases where the acute symptomatology is overwhelming and accessibility is difficult.)

The patient was seen by me three weeks after the onset of her illness. She was still confused, excited and grossly aurally hallucinated. She was hearing the crying of many children. She was naked and was walking about the room in a very anxious, apprehensive manner, but without any co-ordination of purpose or movements. The phase of the illness was one of mental confusion during which she was incoherent in her speech, excited and acutely hallucinated. After her relatives refused to have her admitted into the Asylum at Abeokuta, she was sedated.

After the initial state of excitement and confusion she was still manifesting symptoms of the acute stage but it was obvious that the illness had entered a new phase. When she was seen on the sixth day her confusion had abated considerably but she was anxious and her emotion was one of lability. She was incapable of giving a good account of herself, except for her complaints of her womb—"my children are in there". Her behaviour at some periods could be said to have been based on the fundamental pattern of hysteria. She was convinced that some people were persecuting her and conspiring to "drain her womb" of its contents. She could feel movements in her womb and her illness, according to her, was due to the fact that the vaginal passage was blocked by the effect of native medicine. After a week she still remained in this state of mixed psychoneurotic-psychotic state, with no other evidence of the basic features of any known psychosis.

Her relatives were co-operative and gave the history of the patient. The family history was clear of mental and nervous disease. Her mother had had seven children, five of whom were alive—three women and two men, married with children. The patient's pre-psychotic personality was good—a quiet, but sociable, person. She was of a mixed body build.

Her husband said that the patient had been worried for a very long time over her inability to have children. They had done everything possible but no pregnancy seemed to be forthcoming. They had paid a lot of money to the native medicine men of various cults and they had themselves made several sacrifices to the gods and ancestors. When her husband became apprehensive, though sympathetic, he "married" another wife who later had children by him. The third wife came in 1948 and had already had one child. Although the first wife (the patient) still kept her place and played the role of the first wife, she nevertheless became jealous of the procreative ability of the co-wives.

In October, 1950 she started to report the movements of the co-wives to their husband. She complained that one of the co-wives was using native medicine against her because she was having bad dreams about her. The husband investigated this allegation but found it groundless. By December, 1950, she incorporated her husband into her delusional system and later was able to persuade her own relations to believe her ideas of influence and persecution. She thought her husband was planning to get rid of her because of her inability to have children.

The husband further elaborated on the central core of the psychogenesis of this illness by revealing that as far back as 1944 he could remember her getting restless and worried over an incident. It was revealed that the patient lost her "aso Osu"* after putting it outside to dry in the sun. Her suspicion that somebody might have taken it for magical purposes was confirmed when after many years she found that she had failed to have children. The second wife, who had two children for their husband, was a local girl, and after she came the patient thought that the co-wife's parents must have been responsible for taking her "piece of menstrual cloth", so that when she had failed to procreate, their daughter could usurp her position. Thus the patient built up a plausible system of ideas. The patient later confirmed what her husband said about her illness but entreated me to "open" her womb and to release her children.

On further enquiry it was found that she had missed her menstrual periods for over a year but "her pregnancy was suppressed" by some magico-mystical power of the "evil doer".

* This is the term used for the piece of cloth that native women use for their monthly periods. These pieces of cloth are usually washed and kept from month to month and guarded very closely for fear of being taken by an enemy who might then prevent them from having children or even kill them.

Physical examination was negative. The abdominal examination was quite unsatisfactory. The patient did not allow palpation and every effort to conduct any pelvic examination (per vaginal route) was met with hysterical outbursts because of suspicion. On my advice she was removed to Abeokuta General Hospital, where she was examined under anaesthetics and fibroid was tentatively diagnosed.

Two days after the examination, the patient manifested a florid picture of paranoid schizophrenia. Her prior vague symptom depersonalization (she thought she had changed and become "inexistent" since her "menstrual cloth" was lost), ideas of persecution (of psychogenic origin), and auditory hallucinations (voices of other women saying that she would not live to bear the children in her womb) became well-established.

It has been revealed here that prior to the development of her illness there had been self-reference tendencies of a mild nature. These self-reference tendencies became intense in the acute stage of the disease when only a few pathoplastic features were apparent.

By the middle of February, 1952, pathoplastic features became more pronounced and could easily be studied. Recurrent confusional states (her abdominal "movements" acted as a trigger point) characterized by perplexity, hallucinations of magico-mystical nature, and hysterical hypomanic behaviour completely dominated the clinical picture, while the basic schizophrenic features seemed once more to be clinically quiescent or screened. Not only did the pathoplastic features nullify the intensity of the basic schizophrenic features but the entire symptomatology became less intense and much more vague.

A study of the symptomatology of all the phases of the psychosis revealed a number of the central aspects of her emotional life, within the tribal social expectation. Due to the existence of a primary anxiety the content of her delusion was coloured in this sense. The pathoplastic features seemed to be a purely functional attempt to keep certain affective occurrences out of consciousness.

It should be added here that fibroids (though relatively rare) are a well known cause of psychiatric disturbances in the native women. This patient was later removed to another village to see a medicine man and the writer was never allowed to follow her up. All attempts at hospitalization were unsuccessful.

This patient, after three years in the village, is now reported to have been admitted to Yaba Mental Hospital, Lagos, and the clinical picture is one of clear-cut chronic paranoid schizophrenia.

CASE 2

Summary. This patient was originally diagnosed as paranoid schizophrenia but since she is still well-preserved she is now considered to be among the paraphrenics.

The apparent lack of psychogenic factors is the main feature, but, on the analysis of the cultural factors, a mass of relevant facts had been found symbolized. Her paranoid trends were comparatively localized.

The insidious onset with massive symptomatology, the history of hereditary factor, the psychopathology in relation to the kinship cultural traits, are noteworthy.

The actual precipitant is interesting. Her faith in another religion was betrayed by the return of an exiled chief. She was still able to cope with her mental disturbance until she was abreasted by the violent religious conversion.

The clinical picture was a mass of pathoplastic factors which altered the form of the psychosis.

A.A., a Yoruba-woman aged 36, married, was admitted to Yaba Mental Hospital in 1951. She was brought in by the police because of her confused state and efforts to drown herself in the river. She had spent a considerable part of her time sitting by the river, and whenever she got into this recurrent confusional state she would then obey the voice which commanded her to drown herself.

The family history was questionable. The father "died of 'apeta'" (this is the interpretation that is usually given to explain sudden deaths). She said that an enemy "called" her father when he was asleep and when her father's effigy appeared at "the other end", he was shot. Consequently, "he died in his sleep". Her mother was alive and well, but she had not got on very well with her for a number of years because of the patient's increasing interest in another religion (Obatala) instead of the usual worship of ancestral hierarchy. She was the second of seven siblings.

Two of the brothers were said to have had this type of illness. One recovered sufficiently to become a great shaman and Egungun worshipper (another form of ancestor worship) which, on close inspection, might have a therapeutic effect on schizophrenia comparable to that of Buddhism. The other brother's history was of a legendary nature. She summarized it briefly and said that "he answered the call of Odo Oya (River Niger) and disappeared". Apparently he was never found, dead or alive.

The patient was the fifth wife of an Egba-man. Everything had gone well until she and her only daughter of 17 became great worshippers of "Obatala". There were six children in the family (that is, five by the other wives).

Personal History. Early development was uneventful. She had sucked her big toes when she was a child. Her health in childhood had been good, except for a few bouts of malarial infection. Her early training and environment showed no deviations from the normal pattern in this culture.

She was proud of the fact that she had her first child (which was lost after six months)

three months before she actually "married" her husband. It was a few weeks after the death of the child that she had a severe infection of smallpox. Previous mental health was good.

Pre-psychotic personality traits could not be ascertained, but there were no reasons to think that she was introspective and schizoid in an environment which encourages extraversion.

Present Illness. Her illness started insidiously about three years before her admission. Two years prior to the beginning of her illness she changed her religion and accepted "Obatala" in place of the ancestral cult. This decision was most unpopular with her family, but in spite of this, she was prepared to carry on with it. She was so good at this religious cult that by 1947 she became a well-known figure in connection with certain aspects of it.

During this period (1948) Abeokuta was in chaos, socially, politically, and economically. The people had a few years back revolted against their tribal chief and sent him into exile. She had played a great part as a religious leader in using their influence with the spirits and the earth gods to make permanent the exile of their chief. To this end she, as well as other religious leaders, made sacrifices and other native rituals. "Unfortunately, something went wrong," she said, "and the paramount chief at Abeokuta was brought back by the Europeans." According to her, all their sacrifices and other secret devices "returned"* to them and it was the adverse effect which had caused her illness. As a result of this conception, the voice she heard was supposed to be that of this paramount chief, who had returned from his exile.

According to her husband, she had actually started to show increasing anxiety and morbid preoccupation with her dead father's inability to grant her wishes (that is, to have more children) a few months prior to changing her religious affiliation. That was the main reason why she rejected the concept of, and belief in, ancestral cults and turned to something totally new. It was during this time that she was expressing vague ideas of reference and influence. She openly expressed that her aged mother was a witch and was influencing her inside and later suspected the presence of some people at the annual religious ceremony of Obatala as ominous.

It was not until early in 1951 that she started to make attempts at drowning herself. She at first denied hearing any voices, but later admitted hearing the voice which was commanding her to drown herself.

In comparison with other cases, the psychogenic factors are not easily demonstrable in this case. However, with a knowledge of the culture and study of the role of ancestral cult in the mental life of the native tribe, it may be possible to unravel the genesis of this disorder in this patient. Her ambivalent attitude to the ancestral cult is exemplified in her conscious hostility to her dead father. She had maintained that her father failed in his duty to solicit the spirits on her behalf for more children. This alleged "failure" on the part of her father started a chain of rationalization which in turn led to her total rejection of the concept of, and belief in, the ancestral cults. She became preoccupied with another obscure religion and later had a violent religious conversion at the initiation ceremonies.

The above formulation, which is partly based on empirical findings and partly speculative, has to be weighed against the "normal Yoruba background". A study of this particular religion (the new religion she had adopted) reveals that it subtly involved the mechanism of abreaction. It was during her violent religious conversion that she started to manifest vague ideas of reference and feelings of influence (which at a particular time might even be consistent with the normal phase of that ceremony).

The significance of rivers to this kinship is of great cultural importance: it was their main source of spiritual life. Her kinship had worshipped the spirits (the sea deity of Yoruba mythology) inhabiting the rivers for many years. Thus this cultural factor partly formed the matrix of the psychopathology of her illness.

Physical and laboratory examinations revealed no sign of organic disease. She was well-nourished, but of asthenic habitus. She had optic atrophy of the right eye and said that it was due to an attack of smallpox at the age of 18.

Her mental state on admission was of great clinical interest, due to the prominence of anomalous features which completely dominated the basic factors of the disease. The massiveness of the symptomatology was striking. Apart from her feelings of passivity, influence (her body was being influenced by magic), and ideas of reference (she thought that certain objects on the trees outside the hospital were referring to her and indicating some obscure meanings), depersonalization-derealization phenomena (she vaguely said that since she started her new religion she had already changed and her conception of herself in human shape had altered; also that the nurses in the hospital and the world as a whole seemed altered somehow) were also prominent. She was aurally hallucinated—"I can hear that chief's voice telling me to drown myself."

She was co-operative to a reasonable degree, but her suspicions and delusions of persecution (the paramount chief and his medicine men were out to kill her if she failed to answer the call to drown herself, etc.) prevented her from answering many questions which would have thrown some light on the psychogenic factors. Her memory both for recent and remote events was good.

* This implies the role of the aggressor in Yoruba culture, that is, if an aggressive intention fails, the psychological repercussions might be disastrous. It is a Yoruba custom in these cases to carry out several tests to determine whether a man is the victim or the aggressor. The confusion of cause and effect in Yoruba medical concept is again exemplified.

Orientation for place, person and time was good. Insight and judgment were markedly restricted, but the entire mental state was subject to fluctuations due to a mild recurrent confusional state which was usually ushered in by incoherence, hysterical outbursts and acute hallucinatory experiences (she "found a river" in the hospital grounds, stripped herself and started to make gestures as if she was in it; she spent over two hours running about "because I can see the medicine men running after me"). During some of these twilight states she struck several female nurses, saying they were her mother in disguise.

On the whole the mental state was atypical and mixed. She fluctuated between apparent normality and mild confusional state, but managed to preserve her personality integration to a fairly reasonable degree.

By early 1952 she had improved under institutional care sufficiently to be allowed to go on parole under supervision. Her main symptom was strong delusion of persecution, apart from the recurrent "hysterical" states of confusion, during which, if not properly sedated, she could cause a lot of trouble and violence. Another noteworthy finding by February, 1952, was the alteration in the affective manifestation: the earlier incongruity was later replaced by emotional lability. It was this time, when she had shown some improvement, that the history was elaborated upon, and some information was later given by her daughter. In most cases, it was seldom possible to appraise the clinical pictures with any certainty on the histories available and a single examination.

According to the medical report (communication) from Nigeria, she is still well-preserved and the host of the pathoplastic features enumerated above was still demonstrable in varying mixtures and at intervals. Her delusions of persecution were still maintained. This case, in its basic features, could be considered as paraphrenic whose qualities have been altered by the presence of pathoplastic traits.

CASE 3

Summary. Paranoid schizophrenia of acute onset following an ill-defined incident in which superstition and tribal ideology formed the core of aetiological factors.

The clinical picture manifested clear-cut anomalous features comprising hypomanic traits, hysterical confusional states or cloudiness of the sensorial functions of episodic nature, and auditory hallucinations. Affect varied a great deal. Fairly "systematized" delusion of persecution at the outset, vague religious (Ifa) features and markedly bizarre behaviour.

Rapid deterioration with marked incongruity of affect and fairly prominent pathoplastic features. Remained physically fit throughout.

L.E., a Yoruba-man aged 32, married, was seen in a small village in Abeokuta Province in October, 1951. He was living in the same "compound" as his relatives with his two wives and a child of eight.

His family history was negative, especially as far as any form of epilepsy was concerned.

The patient's development had been normal and he was healthy until he developed left inguinal hernia soon after his marriage to the second wife. He had always been a good worker on the farm and had held a good social position in the village, being the head of the young hunters. He had lived all his life in the village, except for going to the town annually to celebrate "Odun Ogun" (the God of Iron). He was a great exponent of the theory and practice of this religion and his people said that he had saved a great number of people to the displeasure of witches and their spiritual agents. Consequently he had been in their bad books and had been watched for some years. His parents thought that all his present trouble was due to the work of revenge of these witches and shamans through the medium of sorcery. The crisis was reached after the patient's marriage. The girl was supposed to have married the son of a well-known and reputed tribal medicine man about two villages away from their own.

The fact that his sacrifices were not accepted, together with the fortune-teller's forecasts, made him think that the prognosis was hopeless. This was at the time "when they had not succeeded in draining all his brain".

The patient himself, who was a well-built man who talked fluently and at great length in connection with his delusions of persecution, related the story of this chief "in the next village" who, through his practice of sorcery, had exercised undue influence over the adjacent areas with an unusual degree of coercion. He had always "stood up to him in every way". As he said this, he looked faint but he managed to shout across to his father, who was outside his hut. His mental state changed to that of a confusional state in which cloudiness of the sensorial functions was evident and he became incoherent.

The father explained to me that almost every other day this shaman in the other village used sorcery in an attempt to kill him and it was during this period that he usually became like that, since through his own spiritual power he could foretell the attack. The father at this time repeated a few incantations and after about an hour the "evil power" was warded off and the patient resumed his history. I thought that the attack was of a hysterical nature, but that it was not wholly without clinical significance.

Three months before his illness started he married a girl as reported above. It was the Ifa oracle that "directed" this girl to him, but after their marriage he forgot to offer a sacrifice in good time according to the wishes of this great occult force (Ifa) and it was this temporary lapse which weakened his defences (he had a great number of charms around his waist and a number of rings on his fingers). The first thing he noticed was a swelling on his lower abdomen (a left inguinal hernia) which reminded him that he was in danger.

He immediately offered a sacrifice to "Igi Iroko" (Iroko Tree) soliciting its help, "but the second day the spirit left the tree" because the tree was struck by lightning. He knew then that the end had come. For a day or two afterwards he became "a new man". He said he was completely altered and it was the powerful "medicine" used by his father that brought him back to life. I was later told by the father that he was extremely excited, walked about the village looking for the "spirit" which had left the tree after refusing to accept his offering.

Careful physical examination excluded the presence of any organic disease (for example, trypanosomiasis, or post-vaccinal encephalitis, for during that year there was an epidemic of smallpox in Abeokuta province. There was also no history of head injury.)

His mental state exhibited varying degrees of paranoid symptoms which could be related to his cultural environment (ideas of reference, delusions of persecution), with other features (hysterical hypomanic behaviour, cloudiness and incoherence). He was aurally hallucinated, he could hear the voices of sorcerers at their meeting conspiring against him, and during these episodic attacks of confusion he might remain depersonalized for a considerable period afterwards, saying that he had been taken away and what is left behind was something in the nature of his effigy.

His memory both for recent and remote events was good, but during his episodic attacks, in which I have seen him on many occasions, retrospective hallucinatory experiences were interpreted in the light of the tribal general disease concept. His mood was fluctuating and on occasions showed evidence of disharmony. He was correctly oriented, except during his confusional attacks.

Within six months of seeing him regularly he deteriorated very rapidly and his delusions were less "systematized". His behaviour was much more bizarre and there were transitory religious traits in his delusions of persecution.

CASE 4

Summary. Paranoid schizophrenia of abrupt onset, with episodic manifestations and punctuated by many pathoplastic (psychoneurotic) features. Hysterical conversion symptoms, anxiety and frenzied attacks leading to multiple homicide.

Family history was clear. Great fetish religious preoccupations for a number of years. Ill-defined hallucinatory experiences at the age of 16. Recent illness probably was an acute exacerbation (Twilight States may occur as acute syndromes based on a chronic schizophrenia—Bleuler).

Some of the clinical manifestations (e.g. deafness) were definitely hysterical in nature; others simulated hysteria very closely (e.g. the recurrent confusional states). Some of the features of these confusional states are not wholly of hysterical nature as it is usually seen in the European. But, if we insist on describing these observations in physical language, then these reactions, in the rural Africans, must be conceived as abnormal psychological reactions common to a group of paranoid psychotics (and of probably cultural origin) and not as an individual disease.

The clinical picture exhibited multiple phases due to the presence of pathoplastic features. Spontaneous remission almost amounting to full recovery, in spite of vague depersonalization syndrome and body-image disorder at the outset of the illness—usually of bad prognosis (Langfeldt, 1937).

S.O., 29 years of age; male; peasant farmer from Ijebuland. Admitted for observation in March, 1951, after he had killed two people in his village. He had been a very sociable, gay and voluble young man. He had always worked on his father's farm, although a portion was given to him when he married.

Family History. There was no history of mental disease in the family. The father was a well-known figure in Ijebuland and had been a very strict disciplinarian. He was a great fetish worshipper and this religion had been traditionally accepted by the family. The patient's mother was the sixth in line of the co-wives. The siblings were all living locally in the village—four of whom were married. The patient was the only son of his mother and had been somewhat valued and spoiled as a child.

Personal History. The patient was born in an Ijebu village. Birth and early development were normal. He had never been to school but had received a thorough training in fetish religious principles and practice. At the age of 16 he excelled himself in forecasting certain future events which eventually happened as predicted. At this age he also had various experiences. It was revealed that he saw and talked to some spirits who finally conferred upon him a great power to foretell the future and also to manipulate the wishes of the spiritual world. His social and spiritual prestige became enhanced after these experiences.

He married the daughter of a great fetish priest who lived about twelve miles from their village, when he was 25. A child was born two years later and this child was dedicated to the fetish spirits. He married his second wife in 1949.

His previous personality is of great clinical interest. He had always had a rich phantasy life, and his hallucinatory experiences at 16, although regarded as being normal within the cultural concept, could equally be a mild schizophrenic illness around puberty. It was also at this time that he became very preoccupied with the fetish religion and its social ramifications. It can, therefore, be assumed that the fetish religious rites, which have a lot in common with the obsessional mechanism in Western culture, might have held the schizophrenic mechanism at bay. In this respect, Stengel (1945) said, "The opinion has been expressed that the obsessional

personality structure is capable of subduing and aborting schizophrenic reactions." The other alternative to the explanation of the patient's experience at 16 could be that of spontaneous remission, which is not uncommon. Hysterical hallucinatory experiences are not uncommon in this culture and could also receive consideration in this case.

Present Illness. His illness started suddenly with an apparent lack of psychogenic precipitating factors. According to the patient, he returned to the village one afternoon in November, 1950, after he had been working hard. He said that he was very exhausted after working during the heat of the day. After his meal he went into the fetish hut, where he had an appointment with people from another village. During this ceremony he said that half of his body, from his head to his waist, seemed to have left him, and what was left was infested by a spirit. This phenomenon is not uncommon among other religious heads in this culture, especially in those complex religious rites which are highly affectively-charged and which are potentially capable of causing some transient hysterical manifestations.

The patient said that after the ceremonial rites the spirit found it difficult to leave him, and he knew this because for several hours he was "not himself" and his "soul had left" him (a translation of which is equivalent to feelings of unreality. The concept of "soul" in Yoruba culture is synonymous with reality. This fact may account for the inability to observe the symptoms of depersonalization-derealization syndrome by foreign investigators.) Because of this he did not go out of his house for about two months, during which other medicine men did their best to ward off the work of the sorcerers. He said that during this time he could still see visions and had several conversations with his ancestors.

By early February, 1951, he suddenly "exploded" in the words of his father. For several hours he was extremely anxious and apprehensive and then went into what was described as a "trance". By the end of the day he became violent and excited and walked around the village in great confusion, but before he could be taken back to his hut he had already killed two people who were not connected with his illness or with the fetish rites in any way.

He was arrested by the Judicial Authorities in the area and was eventually sent to Lagos, where he was admitted for observation. He was still confused, aurally hallucinated, excited, and very difficult to manage. He was disorientated for time, place and person, and for the first time, manifested some bizarre projection symptoms. He was difficult to examine and it was thought best to sedate him, after a quick physical examination. He was confused for about two weeks, during which time the question of a concomitant organic factor was raised. All physical examinations and laboratory findings were normal. Towards the end of the tenth day he was making every effort to answer the questions put to him, but the train of thought was slow, confused and fragmentary. Affectivity was greatly disturbed. He had many terrifying but transitory hallucinatory experiences, which were accompanied by attacks of rage.

Spontaneous recovery took place about two weeks after his admission. It was discovered that the emotional factors which had played a big part in his confusional state (as evidenced by his hallucinations and contents of his utterances) were now being projected on a delusional basis. The katathymic delusional formation centred around his religious experiences. Ideas of reference and influence were evident, but his main source of anxiety (and occasional state of panic) was the persecution by the malevolent spirits whom he could hear everywhere. He denied having killed anybody and had massive amnesia for the short acute phase of his illness.

What was originally thought to be an acute phase of his illness became an episode. His (? hysterical) twilight state recurred, complicated by the states of wandering (fugues). He escaped from the hospital and was found wandering in the bush twenty miles away. The content of his twilight state was essentially one of anxiety with falsification of the environment by visual and auditory illusions and hallucinations. He recognized the people who went to fetch him as fetish gods and heard voices saying that the spirit had now left him.

Once again he recovered spontaneously from this recurrence of confusional states but he never once became normal in the intervals which varied from days to months.

During these intervals, schizophrenic features usually came more to the fore as evidenced by his bizarre mannerisms, train of thought and entire mode of expression, passivity feelings, ideas of influence and self-reference tendencies. The affects were subject to marked fluctuations due to underlying anxiety. Thus his affective states could be manipulated by touching on his religious fears. During this phase, his attention, orientation for time, place and person were unimpaired. Memory was still defective for the episodic confusional states, with a tendency to falsify his hallucinatory experiences.

In September, 1951, after several episodic confusional states, his illness remitted spontaneously and for the first time seemed normal, but he started to manifest vague hypochondriacal symptoms (pain in his abdomen, headaches, inability to hear properly, and lack of feeling over his chest) with underlying anxiety. He finally developed hysterical deafness for about two months, after which his auditory hallucinations disappeared.

The patient can be said to have fully recovered; inasmuch as he has not had a recurrence for almost a year. He is still doing very well and seems to have got over his "complexes" about the intricacies of fetish religion.

SPECIFIC DIAGNOSTIC FEATURES

I. DIAGNOSIS

The diagnosis of paranoid psychosis (whether this is paranoid schizophrenia, paraphrenia or any intermediate clinical entity) in the literate Yoruba

tribe does not present any difficulty arising from the cultural aspect. The present study presents no evidence that paranoid psychosis (within the accepted diagnostic nomenclature), among the literate (urban) Yorubas, is significantly different from the point of view of aetiology, diagnosis, psychotic manifestations or prognosis from that of paranoid psychosis in Western culture.

If the Westernized Yoruba-man has innate psychological qualities which differ from those of the Europeans, he will be expected to react differently to the same environment or similar traumatic stress, because of a different constitutional pattern. This hypothesis is not supported by the observations in this work. Morris's (1951) observation lent an indirect support to this important finding. Morris found a similarity of constitutional factors in psychotic behaviour in India, China and the United States. Clinical observations in this work have shown that the literate Yoruba-man's psychotic pattern is similar to that which is usually encountered in Europe.

If these innate mental differences exist, we should, according to psychological principles, expect a pattern of response with quality (and perhaps quantity) as determining factors. This work shows that the same diagnostic criteria and assessment of prognostic possibilities which hold in Western culture are equally applicable to the Yoruba patients who have been in contact with Western culture. These, however, do not seem to hold with patients whose cultural background is as different as that of the non-literate (rural) Yoruba tribe.

It is of great clinical importance to mention that the *basic* psychotic manifestations are similar in the two groups and, therefore, similar to those which are commonly described in Europeans. Furthermore, the degree of variation in the basic symptomatology in individual cases (in the two Yoruba groups) is not greater than that which exists in individual cases in Western culture. Apart from this basic similarity the pathogenic factors are essentially heterogeneous, and this is probably due to cultural variations.

The most important single factor in connection with the diagnosis of paranoid psychosis in the non-literate group is the variation in its phases, which is attributable to the admixture of its symptomatology.

For the sake of brevity and clarity, the most important diagnostic features will be discussed under two headings:

(a) *Mental Symptomatology of the Initial Stage (Acute Phase) of the Psychosis and its Diagnostic Significance*

During this phase, frank clinical expression of the underlying disorder is vague, unimpressive, due to an overlay of psychoneurotic phenomena. It is possible that in this phase the effective sector may be so active that the basic feature of the illness is completely overshadowed by mental confusion and projection symptoms.

Therefore the picture of mental confusion invariably dominates the acute stage of the disease. In the two improved cases which had commenced acutely, complete or partial amnesia for the acute stage was encountered. This is a very significant point, since it shows that in some of these cases we are dealing with a special group of symptoms of predominantly psychogenic origin.

The psychodynamic function of mental confusion in certain acute psychotic states appears to be that of defence; that of keeping out of awareness various affects which are conceived as intolerable to the ego and of disrupting the interpersonal relations which concurrently exists. Rosenfeld (1950), in his "Note on the psychopathology of confusional states in chronic schizophrenias", has

expressed the view that it may be that in many instances, particularly in acute psychoses, the ego is threatened with the sudden access into awareness of an overwhelmingly great intensity of affect, so that in addition to a delusional defence, mental confusion is immediately erected to reinforce the primary delusional projection. The essential feature of the acute stage, therefore, is the screening of psychotic reactions by psychoneurotic symptoms, a mental mechanism manifestly brought into play to prevent a break with reality.

Nolan D. C. Lewis (1949) has stated that the differentiation of the individual from his social environment and "the relationship of the person to the herd is an evolutionary process which has developed late". While this state has been achieved by Western culture, the primitive African largely identifies himself with his social environment.

(b) *The Diagnostic Importance of Pathoplastic Factors*

This symptom-complex, referred to above, represents the patient's elementary psychical responses in his native environment to external stimuli. The reality underlying their appearance is an activity similar to that which we know to exist in psychiatric disorder complicated by physical illness like diabetes, and phthisis.

Their cultural origin is supported by the following observations: (i) these ill-defined symptoms are present in varying degrees and severity in other psychoses in the non-literate (rural) population, with a greater predilection for paranoid psychosis or the schizophrenic group as a whole, especially those in which psychogenic factors are easily demonstrable; (ii) they may disappear at any time and leave no trace in the further process of the underlying (primary) disorder; (iii) they are not uncommon in some Westernized patients who invariably show more permanent regression to tribal beliefs and ideological concepts. This latter group is usually composed of detribalized individuals who occupy the region of no-man's-land between the "pure native" (primitive) and the Westernized group. Aggressive excitement, restlessness and bizarre psychoneurotic features are not an uncommon accompaniment of all the principal forms of schizophrenia in the rural group, especially when under observation in their home environment.

While most of these pathoplastic factors are of apparent psychoneurotic origin, they have no distinct features in themselves, that is, they are in themselves atypical. For example, the type of Anxiety State that may be associated with or precedes the psychotic manifestation in the non-literate group is multiphasic. It usually starts in the classical form, assuming a crescendo and may terminate in a hysterical hypomanic state (state of frenzy, pseudo-running amok) during which the patient is often dangerous.

Thus these contributory factors to the basic manifestations of paranoid psychosis are in themselves sources of clinical confusion.

The diagnosis of paranoid psychosis in this tribal environment should, therefore, take into consideration the important clinical finding that the psychosis includes a multiplicity of disordered states which nevertheless have a precise relation to the cultural traits of Yoruba personality structure.

II. DIFFERENTIATION FROM ORGANIC DISEASE

It is important to point out here that when a schizophrenic psychosis in the rural (non-literate) tribe is precipitated by organic illness, it nearly always presents the classical features of schizophrenia and the pathoplastic features mentioned above are not apparent. In other words, when confronted with a paranoid schizophrenia (in the non-literate group) with symptoms that are

usually described in Europeans or in literate (Westernized) Yorubas, organic causes should be looked for. This fact had also been observed in the Gold Coast by Tooth (1950) when he said, "Among the 'bush' peoples, a typically schizophrenic picture is most likely to be due to organic illness."

The above observation confirms the cultural origin of the atypical features mentioned above, which are almost invariably absent when the mental illness is organically precipitated. The most common causes of organic paranoid psychosis are trypanosomiasis, cerebral malaria, and neurosyphilis, especially when the temporal lobe is predominantly affected. The absence of pathoplastic features is characteristic in the organic paranoid psychoses.

The confidence with which this observation is stated should not lead the reader to believe that we are in a position to validly postulate any, even the slightest, degree of causal relationship between the observed clinical facts and mental differences which are determined by the genetic characters of the central nervous system.

Carothers's (1953) assumption that all the mental syndromes which are usually found in African psychiatry "can be envisaged in terms of frontal lobe idleness" does not in itself show, or allow us to conclude, that there are innate or racial mental structures which are characteristic of certain types of brain functional capacity and morphology.

Thus the acceptance of Carothers's assumption commits us to the view that the organization of living things (responses of the organism in development, behaviour and functional adaptation) is purely material organization.

In examining Carothers's argument we may, first, question whether, if the premises be granted that there are structural and/or functional differences in "the cortex of the native brain", the conclusion, that primitive African mentality (especially the psychiatric syndromes) "can be well linked with" this, necessarily follows; secondly, we may enquire whether the premises are well established as inductive generalizations.

Mental power in Foster Kennedy's (1911) view is an integrated function of the brain as a whole. The present work has confirmed the previous observation of Tooth (1950) that schizophrenic psychosis precipitated by a physical illness among primitive Africans, is fairly typical in its manifestations (i.e. exhibits clinical features which are commonly described in Western culture).

There is, then, no sufficient *a priori* ground for assuming that in the absence of the full functioning of the frontal lobe, "insanity takes a somewhat amorphous form".

III. THE DIAGNOSTIC SIGNIFICANCE OF THE BASIC PSYCHOTIC MANIFESTATIONS

From what has been observed among this tribe it will be unwise to attempt to differentiate too rigidly (in terms of diagnostic categories) between the paranoid schizophrenias, the paraphrenias and the paranoias (no case was found in this investigation which could unreservedly be labelled as paranoia). Bleuler (1924), for instance, did not think that the diagnostic differentiation of the paraphrenias from the other acute or chronic paranoid forms was ever possible, in contrast to Kraepelin's view. Bleuler also believed that most of these cases bear some genetic relationship to the schizophrenias.

While we can agree with Lewis (1949) that "it is quite difficult in the light of our present knowledge, to consider schizophrenia as an entity having any definite form, function or special characteristic behaviour", the basic clinical pictures in a great majority of these cases seem to be related to the schizophrenias as they are understood today.

When paranoid psychosis in the non-literate (rural) Yoruba is devoid of its pathoplastic traits, one is confronted with a clinical picture, which is comparable to that of the Westernized group, and also in which it is almost impossible to draw any hard and fast lines of symptomatological differentiation.

DISCUSSION AND CONCLUSIONS

An unrestrained scientific imagination on the part of earlier and some modern investigators has led to the appearance of a number of theories on the relationship between racial factors and psychological differences. Recent research has shown more and more clearly that these theories were not borne out by the facts. We must therefore examine the alternative hypothesis of the influence of culture on normal and abnormal psychological reactions.

Obviously, the first essential pre-requisite is the application of reliable diagnostic criteria which are controlled by the consideration of the concept of the normal in that particular cultural setting. From the point of view of understanding the cultural factors and their psychological significance among primitives, the important point raised by MacCurdy (1946) is of practical significance. MacCurdy stated that "the psycho-pathologist would never expect to find that a formal description of its institutions and customs would provide adequate material for an explanation of any society. Nor would a description of group reaction be acceptable. He would, rather, expect the true nature of the culture could be found only by an analysis demonstrating both formal and behaviour phenomena as expressions of fundamental trends that were revealed in symbolic form." From a strict methodological point of view, MacCurdy's consideration shows how dangerous are the conclusions drawn by those psychiatrists who are often ready to carry over and exploit chance observations from the anthropologist's field in order to explain clinical facts.

The present work has confirmed Hallowell's (1936) hypothesis that while the specific psychogenic factors engendered by different cultures may vary and the psychopathology of individuals may reflect the traditions of their society, generally speaking, the fundamental basis of most mental disorders will remain comparable insofar as we can account for their mechanisms in terms of common psychodynamic formulations. It has also been shown in this work that when the social and cultural environments of two racial groups become similar (as it is in the case of Westernized Yoruba and the Europeans), their normal and abnormal mental reactions show corresponding similarities.

It has been stated by some investigators that paranoid schizophrenia is not as common in primitive society as the catatonic sub-type. Carothers (1953) stated, "Paranoia, paraphrenia, and even paranoid schizophrenia are relatively rare in Africans" and he quoted Gordon (1936) and Minde (communication) to support his findings. The present writer's experience has not confirmed this finding among the Yoruba tribe and, furthermore, the distribution of all the sub-types of schizophrenia does not seem to vary among the Westernized and the primitive (non-literate rural) group. The observations made by Tooth (1950) and Yap (1951), who worked among the West African tribes and the Chinese respectively, do not support Carothers's impressions. Yap commented that Carothers's impressions "could only be true if the people concerned were so primitive as to have only the rudiments of language".

Carothers, however, gave a plausible explanation of this alleged rarity. He said, "The criteria used in separating paranoid form from other types of

schizophrenia were a tendency to chronicity in the delusions and a fairly good preservation of the personality in the former." Having argued that systematization is essentially a function of the frontal lobes, and also that the preservation of the personality and chronic delusions must be based on some degree of systematization, he concluded, "... it is precisely this quality which the primitive African and the leucotomized European tend to lack". Yap (1951) argued that the most likely explanation, "supposing it were true, is that the observer cannot understand what the patient says, and that possibly the patient is thereby discouraged from communicating his thoughts to him in speech".

The more acquainted one becomes with simpler society, the greater the conviction that man is an evasive entity, very rarely caught in difficult situations in which he would be willing to surrender to a complete and unreserved study as a personality. Usually the difficulty involved is greatly enhanced in the presence of socio-cultural barriers (e.g. the problem of language) when an attempt is made by foreign observers to penetrate the inner quality of the native mind and to supply some information on (often an interpretation of) his responses.

In their quest for facts some, unfortunately, are apt to offer a series of apparent assumptions. For instance, Carothers's (1953) thesis on the absence of obsessional neurosis states that "it seems that rural Africans, children and adults, seldom or never develop such reactions on individual lines, since this behaviour is the normal pattern of their lives", but this is questionable. (See also quotation from Davidson by Carothers, *ibid.*, p. 151.) There is no doubt that certain aspects of primitive ways of life are full of prohibitions and rituals but the present writer has seen true severe obsessional neurosis in rural Africans. Tooth (1950) also recorded two cases on the Gold Coast.

Obsessional neurosis in primitive Africans is usually masked by, or mistaken for, normal native religious rituals. Therefore, the essential pre-requisites for sound diagnosis are thorough knowledge of the language and the sub-cultural group to which the patient belongs, for example, his religion. From the diagnostic standpoint, obsessional neurosis seems to be the most formidable of all the varieties of psychoneurosis among primitives. This is probably due to the fact that the apparent elasticity of the cultural environment to accommodate the symptoms is great. However, certain recognizable qualities of the reactions and the disproportionate degree of anxiety provoked by failure to carry out these reactions contrast sharply with the ordinary prohibitions and rituals in the culture.

All the previous observations concerning the nature and relative incidence of psychosis and psychoneurosis in the primitives were made mostly by foreign investigators (usually anthropologists) and the nature of their inferences in view of the difficulties involved in the diagnosis should suffice to convince anyone of their untenable ground.

Intensive study and analysis of a body of clinical materials from a specific (primitive) culture is still needed to validate some of the interesting hypotheses that have been advanced by various investigators before definite conclusions can be made. Our phenomenological studies have not been completed and the existing cultural institutions and ideals may have to be wholly revised. However, there is no doubt that paranoid schizophrenia (and paraphrenia) might be ubiquitous, but cultural factors play an important role in its clinical manifestation and therefore have strong bearing on the entire management of the patient.

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BIBLIOGRAPHY

- ACHERMAN, N. W., "Paranoid States with Delusions of Injury by Black Magic", *Bull. Menn. Clin.*, 1938, **2**, 118-126.
- BENEDICT, R., *J. General Psychol.*, 1934, **1**, 79.
- BLEULER, E., *Textbook of Psychiatry*, 1924. London. (Dover re-issue, 1951.)
- B.M.J., "Disease, Race and Civilization", 13 June, 1953, p. 1320.
- BRILL, A., "A Psychoneurosis among the Ainu", *J. Nerv. and Ment. Dis.*, 1913, **40**, 518.
- BURSTIN, J., *Schizophrénie et Mentalité Primitive*, 1935. Paris.
- CAROTHERS, J. C., "A Study of Mental Derangement in Africans and an Attempt to explain its Peculiarities, more especially in Relation to the African Attitude to Life", *J. Ment. Sci.*, 1947, **93**, 548.
- Idem*, "Frontal Lobe Function and the African", *J. Ment. Sci.*, 1951, **97**, 112.
- Idem*, *The African Mind in Health and Disease (A study in Ethno-Psychiatry)*. 1953. World Health Organization, Geneva.
- CATTELL, R. B., *Psychology and the Religious Quest*, 1939. London.
- COOPER, J. M., "The Cree Witiko Psychosis", *Primitive Man*, 1933, **6**, 20-24.
- Idem*, "Mental Disease Situations in Certain Cultures" (A new Field for Research), *J. Abnorm. and Soc. Psychol.*, 1934, **29**, 10-17.
- DENNETT, R. E., *At the Back of the Black Man's Mind*, 1906. London.
- DEMERATH, M. J., "Schizophrenia among Primitives", *Amer. J. Psychiat.*, 1942, **98**, 703-707.
- DEVEREUX, G., "A Sociological Theory of Schizophrenia", *Psychoanal. Rev.*, 1939, **26**, 338.
- DUNJIBHOY, J., "A Brief Résumé of the Types of Insanity commonly met with in India", *J. Ment. Sci.*, 1930, **16**, 254-264.
- ELLIS, A. B., "Latah", *J. Ment. Sci.*, 1897, **43**, 32-40.
- FARIS, E., "Some Observations on the Incidence of Schizophrenia in Primitive Societies", *J. Abnorm. and Social Psychiat.*, 1934, **29**, 30-31.
- Idem*, "Culture and Personality among the Forest Bantu", in *Nature of Human Nature*, 1937 (by Faris). New York.
- FIRTH, R. W., *Racial Traits and Mental Differences in Human Types*, 1952, p. 38. London.
- GORDON, H. L., "An Enquiry into the Correlation of Civilization and Mental Disorder of the Kenya Native", *East Afr. Med. Journ.*, 1936. February.
- HALLOWELL, A. I., "Culture and Mental Disorders", *J. Abnorm. and Soc. Psychiat.*, 1934, **29**, 1-9.
- Idem*, "Psychic Stresses and Cultural Patterns", *Amer. J. Psychiat.*, 1936, **92**, 1291-1310.
- HERKOVITS, M. J., *Freudian Mechanisms in Primitive Negro Psychology*, 1934. (Essays presented to C. G. Seligman, 1934.)
- LANDIS, —, "The Personality of the Ojibway", *Character and Personality*, 1937, **6**, 51-60.
- LAUBSCHER, B. J. F., *Sex, Custom and Psychopathology*, 1937. (A Study of South African Pagan Natives.) London.
- LEVY-BRUHL, J., *La Mentalité Primitive*, 1926. Paris.
- LEWIS, N. D. C., *J. Psychotherapy*, 1949, **3**, No. 1, 4. January.
- LINTON, R. M., *The Study of Man*, 1936. New York.
- Idem*, *The Cultural Background of Personality*, 1945. New York.
- LOPEZ, —, "Ethnographische Betrachtungen über Schizophrenie", *Zeitschrift f. d. ges. Neur. u. Psychiat.*, 1932, **149**, 706-711.
- MACCURDY, J. T., *The Study of Society*, 1946. London.
- MAUDSLEY, H., *The Pathology of Mind*, 1895. London.
- MEAD, M., *Psychiatry*, 1947, **10**, 57.
- MONTAGUE, A., *Introduction to Physical Anthropology*. 2nd ed. 1951. Springfield.
- MORRIS, C., Clinical Notes: "Similarity of Constitutional Factors in Psychotic Behaviour in India, China and the United States", *Am. J. Psychiat.*, 1951, **108**, 143.
- NADEL, N. F., "The Typological Approach to Culture", *Character and Personality*, 1937a, **5**.
- Idem*, *The Foundations of Anthropology*, 1951. London.
- NOYES, A., *Modern Clinical Psychiatry*, 1953. 4th ed. London.
- O'MALLEY, M., "Psychoses in the Coloured Race", *Amer. J. Insanity*, 1914, **71**, 309.
- REIK, T., *Ritual: Psychoanalytical Studies* (Trans. D. Bryan), *Int. Psychoanal. Lib.*, 1931, No. 19, p. 36. London.
- RITCHIE, J. F., *The African as Suckling and as Adult*, 1943, p. 12. Livingston.
- ROSENFELD, H., *Int. J. Psychoanal.*, 1950, **31**.
- SAPIR, E., "Cultural Anthropology and Psychiatry", *J. Abnorm. and Soc. Psychol.*, 1932, **27**, 229-242.
- SCHMIDEBERG, M., "The Role of Psychotic Mechanisms in Cultural Development", *Int. J. Psychoanal.*, 1930, **11**, 387-418.
- SCHOTTKY, A., *Race and Disease*, 1937. Munich.

- SELIGMAN, C. G., "Temperament, Conflict and Psychosis in a Stone Age Population", *Brit J. Med. Psychol.*, 1929, **9**, 187-202.
- SILBERMAN, L., *Analysis of Society*, 1951, p. 156-7. London.
- SHELLEY and WATSON, "An Investigation Concerning Mental Disorder in the Nyasaland Native", *J. Ment. Sci.*, 1936, November.
- STORCH, A., *The Primitive Archaic Forms of Inner Experiences and Thought in Schizophrenia*, 1924. New York.
- TOOTH, G., "Studies in Mental Illness in the Gold Coast", *Colonial Res. Publ.*, 1950, No. 6. H.M. Stationery Office, London.
- VAN LOON, F. H. G., "Amok and Lattah", *J. Abnorm. and Soc. Psychol.*, 1926, **21**, 434-44.
- YAP, P. M., "Mental Diseases peculiar to certain Cultures" (A Survey of Comparative Psychiatry), *J. Ment. Sci.*, 1951, **97**, 313.
- Idem*, "The Latah Reaction", *J. Ment. Sci.*, 1952, **98**, 515.

THE GANSER STATE

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INTRODUCTION

THE aim of this paper is threefold:

- (i) To review critically the literature on the Ganser State and clarify its meaning.
- (ii) To provide a case illustration with some hitherto unreported features.
- (iii) To present psychological test results, which has not previously been done in a case of this kind.

REVIEW

The Ganser State is afforded a brief paragraph in most psychiatric texts; usually, these merely repeat more or less what has been stated in earlier works. The general impression conveyed is that it is a hysterical reaction not uncommon in prisoners and sometimes found elsewhere, its unconscious motivation being to make the individual appear insane and thus absolve him from responsibility. The central symptom of the cluster is frequently referred to as "Vorbeireden" which has been translated as "talking past the point" and "talking beside the point". It is difficult to trace the origin of the use of the word, "Vorbeireden", in this context: it certainly does not appear in Ganser's original article (1898), and in his second (1904) it is present only in a quotation from Nissl and in the title of a paper by Westphal ("Über hysterische Dämmerzustände und das Symptom des 'Vorbeiredens'," 1893—this may be the earliest use of the expression). In any case, the English expressions, "talking past the point" and "talking beside the point", mean two different things neither of which corresponds to the essential symptom as described by Ganser—nor does "talking at cross purposes", which is a more accurate translation. A word Ganser does employ is "vorbeigehen", and the literal translation of this conveys the meaning better than any of the afore-mentioned phrases: "to pass by"—the patient "passes by" the correct answer to a question and gives one near to it. Thus it is necessary to go back to Ganser's own words.

Ganser said that the most striking feature presented by these patients was "dass sie Fragen allereinfachster Art, die ihnen vorgelegt wurden, nicht richtig zu beantworten vermochten, obwohl sie durch die Art ihrer Antworten kundgaben, dass sie den Sinn der Fragen ziemlich erfasst hatten, und dass sie in ihren Antworten eine geradezu verblüffende Unkenntnis und einen überraschenden Ausfall von Kenntnissen verriethen, die sie ganz bestimmt besessen hatten oder noch besaßen" (1898). Examples of these two types of response, (a) answers to the simplest questions which are incorrect but which

show that the sense of the question has been approximately understood (like answers sometimes given by children), and (b) answers showing an astonishing ignorance and deficit of knowledge which must definitely have been or still be in the patient's possession, are as follows:

- (a) Asked what is $3+2$, the patient replies "7"; $4-1$, "5"; to count from 1 to 20, does so with several omissions; what comes after 1, "2", and then, "12, 93"; how many legs a horse has, "3", an elephant, "5"; how many fingers he has, "11".
- (b) Asked where he is, "Berlin, in Russia"; what they are doing, "We want to go hunting"; how many eyes he has, "No eyes"; how many noses, "I don't know"; what his name is, "Fürst" (incorrect). Asked to name a key presented to him, "Revolver"; to tell the time, reads it five hours behind; to read letters, does so partly correctly; to read a paper, "Bismarck, König, Albert, Rothschild, Geld", etc., changing the order of these words as he repeats them; to name a Thaler, a Mark and a 50 Pfennig piece, calls them all a Mark. (Later, however, he read correctly and named the coins correctly.)

These answers, which may be described as "approximate" and "ridiculous" respectively, were interspersed with correct answers. The question at once arose whether they were serious or simulated responses, particularly as they occurred, in three of the four cases, in prisoners on remand. Ganser was emphatic that they were genuinely ill persons and that he, as an experienced observer, never had the impression that they were trying to deceive him.

The other symptoms common to the four cases, concurrence of which Ganser regarded as significant and simulation of which by the psychiatrically uninformed as most unlikely, were: auditory and visual hallucinations; spatial and temporal disorientation; amnesia for the actual situation (amnesia for the state when reverted to normality); hysterical analgesia or hyperaesthesia; and lack of insight—all within the setting of a more or less disturbed, "twilight" state of consciousness of fluid character and short duration. In some of the cases there were later recurrences of this twilight state. This changing state of consciousness with memory defects he viewed as characteristic of the acute, hysterical disturbance and dubbed a "hysterical twilight state". Differences among the patients lay in the degree of their general activity, alertness to surroundings, promptness in answering questions and presence or absence of anxiety and of self-blame.

In his second paper, Ganser (1904) remarks that the patients were not surprised or irritated at the stupidest questions or at the low estimate of their intelligence implied, and that they made an effort to find the answer. The errors were not always constant, i.e. there were inconsistencies of response. Other common features were headaches and difficulty in focussing attention sufficiently to answer the questions put. Ganser had by this time seen more than twenty such cases, which occurred more frequently than he had at first thought. He now takes up the question of whether these cases were a hysterical reaction or a catatonic negativism, as some writers averred. Among the catatonics he had seen were some with manifestations generally regarded as hysterical, viz. certain convulsive and sensory disturbances: Kraepelin, he thought, had not given sufficient attention to these manifestations; for Nissl, they were signs of a later psychosis only outwardly resembling hysterical signs. Ganser, however, advanced in his outlook, realized that hysteria and catatonia are independent, that hysteria may occur with another disorder, functional or organic, giving rise to complex states or superpositions, and that persons with hysterical

temperament may or may not develop a hysterical disorder. He illustrates this from his case material.

Flatau (1913), in a review some ten years later, remarks on the increasing number of non-criminal cases reported—at least a third of all cases of this type—and on the decreasing number of relevant publications appearing. The total number of cases reported by some twelve authors seems to have been just over forty at this time, in addition to Ganser's twenty-odd and Flatau's four (of which at least two were doubtful Ganser states). Flatau stated that in non-criminals the state is usually of shorter duration and less intensity.

A search through the literature in English brings to light a mere handful of cases, and of these some are doubtful and some certainly not Ganser states. Bender (1934) describes several cases of women who had murdered their children; of three who appear to have been schizophrenic, one was said to have developed "a definite Ganser Syndrome", another "a Ganser-like state" and the third "some Ganser-like features", subsequent to arrest. For none, however, are unequivocal examples of the approximate and ridiculous answers (here considered a *sine qua non* for this diagnosis) provided: the samples of talk given show disorientation, confusion and a tendency to incoherence. In a later report, Bender (1938) cites two further cases more clearly falling into this category: one was described as a combination of alcoholic-toxic, depressive, hysterical and malingering features, arrested for killing his wife, who gave such responses as that a mouse had five legs and that a green blotter was blue; the other, a schizophrenic, arrested for "panhandling", called a dictionary a Bible, gave the name of the hospital (Bellevue) as Belmont Hotel and the duration of his stay as 12 years instead of days, took out his penis and pointed to it when asked to point to his tongue, and so on. "It is as though the individual", says Bender, "having heard the question, used it as an association test and gave the association word as an answer. This requires that the actual answer must be inhibited and that a related word or idea is offered instead." She also gives examples of the performance of these two patients on her visual-motor Gestalt test, which show confusion and disorientation: these characteristics, however, seem to have been a product of the more serious disorder rather than of the Ganser state and unlike the "near misses" of the case reported below by the present writers. She also describes the drawings of physicians, students and nurses assigned the task of drawing as though they were defectives and states that they were unable to conceal the essential Gestalt principles appropriate to their maturational level. One might comment that such productions should not, *a priori*, be expected to resemble those of Ganser patients; and in any case the test has not been adequately validated as an instrument of differential diagnosis.

Anderson and Mallinson (1941), noting that very little had been contributed to the problem since Flatau's paper, report three cases. One is said to have had depressive, manic and catatonic features; his symptoms included depersonalization and derealization, ideas of reference and delusions of an electrical force, masturbating openly and being doubly incontinent, in addition to "Vorbeireden" (sic); his behaviour under sodium amytal, however, led the authors to conclude that this was "a pure depressive illness in an obsessional and hysterical personality" and that "no schizoid features whatever were revealed" . . . The second case, who appeared as "feigned insanity overlying a depressive state", gave answers always "beside the point" and sing-song fashion. The third, diagnosed as schizophrenia, said that the month (February) was "January", that two plus two was "one", that a cigarette case was a "bird"—told to answer correctly,

“silver”—again told to answer correctly, “a case”. Other examples given are even less “approximate” and the authors go on to say that “the whole stamp was ungenune”—which is quite contrary to Ganser’s findings. In none of these cases does a clear relationship emerge between the advent of the alleged Ganser state and a potential gain for the patient—in one case, it meant a ruined career. None of these cases, then, has convincingly been demonstrated as a Ganser state.

Stern and Whiles (1942) announce that the concept of hysteria has changed considerably since Ganser’s time and “his cases would now be regarded as psychotic” (*pace* Ganser!). Again we are told that this state is common in prisons although rare elsewhere. In this offering, concerning “Three Ganser States and Hamlet” (more than half of which is taken up with quotation from *Hamlet*), one case was a woman suffering from “mania with schizoid features”, whose replies to questions about her situation were that “It was a hospital, but is not now” and that she was “knitting” there: she was claiming compensation for an accident but in the circumstances a physical would have been much more likely than a mental symptom to yield success—and, in any case, at the time of the examination she denied that she was suffering from any mental illness. The second case was a schizophrenic, reported to have given Ganser answers on admission to hospital: an example given is the statement that his age was 19 (instead of 35); motivation, too, is again questionable—this man had already been certified in prison. The third of this series developed a buffoonery syndrome (not clearly distinguished from a Ganser state by the authors) after being found wandering by the police; he gave “Black” as his name, “White” as where he lived, “Six months” as his age; he drew a straight line when told to write his name: this occurred *after* he had been discharged from the Army. Again, we have a batch of doubtful cases. With reference to the Danish prince, the fallacy of applying psychiatric methods to a fictional character is touched upon by Davie (1942) in a rejoinder. Such pursuits are more appropriate to the dilettanti delving in the No-Man’s-Land between psychoanalysis and literature.

Lieberman (1945),* after the usual ascription of “Vorbeireden” to Ganser, states that “from the available literature it seems . . . evident that the classical syndrome has become less frequent in its pure form so that today it can be looked upon only as a symptom-complex engrafted upon or portending one of a variety of nervous or mental disorders”. Lieberman’s case is described as containing features of “the hysteriform, the epileptiform, the alcoholic and the diffuse organic disorder” and of “a chronic schizophrenic thought disorder”, in the somewhat heterogeneous manner not uncommon in these cases. This, however, is clearly a patient who experienced a Ganser state, from the full account of his behaviour given. He was vague, apathetic and disoriented; amnesic and lacking insight; echolalic and perseverating in parrying questions; he gave approximate and rather fatuous responses in both language and other behaviour. The alphabet and the months were recited with omissions and repetitions; three plus two was six; he read in a manner remotely resembling the written words and could not read numbers; he wrote his name properly but did not decipher what he had written. A handkerchief was called a cloth, an electric fan a wind charger, a 5-cent piece a dime, and all the primary colours were misidentified. A matchbox presented visually was a kite (“Lite King” was printed on the box), presented tactually it was dynamite, then paper; a pencil

* A later article by Lieberman (1954) reports three further cases but has little new to contribute.

presented visually was not named but referred to as yellow, then as wood and as red (the colour of the eraser), tactually it was a pen. He did the opposite of what was required in single acts, part correctly and part reversed in component acts. Under sodium amytal, he gave correct answers to most of these questions when they were repeated but returned to the previous mode after 25 minutes. His p.g.r. showed wide fluctuations in response to leading questions suggestive of "escape" from some as yet undefined situation, and on another occasion a similar response was elicited when he was accused of simulating mental illness. In the ensuing months there was a rapid deterioration.

Laing (1953) reports a case which appears to be one of hysterical puerilism rather than Ganzer state. He did give answers like "Two" for 2×2 , called an orange an apple and said that leaves appeared on trees in the autumn, but in general his behaviour was infantile with reiterated screaming, "Mom, me Mom's good, me Mom's good . . . I'm only thinking of me Mom!" He acted similarly under pentothal narcosis and there were still no correct answers under hypnosis. It should also be noted that this patient "appeared both to resent and to fear being questioned", which—as previously observed—was not characteristic of Ganzer's patients. This patient had been referred for an opinion on his fitness to undergo trial by court-martial for desertion.

Wertham (1949) describes a patient who had been labelled Ganzer after an examination subsequent to his incarceration for indecent exposure. This man "put on a strange act", saying, "I don't feel a bit good. My head ain't right. I think I am going crazy." Later he said, "I think I should go to a State Hospital. My mind isn't just right." For days he was mute. Then he gave answers like "329" for 392; "I don't know . . . 10 or 11" for the number of fingers on his hand, after scrutinizing them; different names for the President on consecutive days. He pointed to his right ear for his left, opened his mouth when told to close his eyes, miscopied simple geometrical drawings, put a manikin figure together with the head on one shoulder and one arm wrongly placed. He did not know the date, and he was amnesic for the offence. Later, in the penitentiary, his performance on psychological tests (of which we are given no details) was inconsistent, simple items were failed and difficult ones passed and I.Q. varied from 64 to 91. Wertham regarded this as a dubious case of a Ganzer reaction, rather as one of definite and conscious simulation. He saw the patient again years later in an institution for the criminal insane, just after he had made two suicidal attempts, and found him the same suspicious and guarded person as previously. This case, then, may be regarded as one displaying features of both Ganzer and malingering type, somewhere along the continuum stretching between them (q.v.).

Thus, of these fourteen cases reported by various writers, most do not appear to warrant the description of Ganzer state.

French and Italian contributions to this problem do not appear to be any more satisfactory. Riese and Requet (1937) report "Vorbeireden", simulation and non-recurrence of the state ("After the disappearance of the state, as such, the patient cannot relapse"), all in contradistinction to Ganzer. Their case had a previous history complicated by head injury, neurotic symptoms and syphilis. He was a man of forty-three who had been arrested for indecent behaviour towards an eleven-year-old girl. A week after admission he appeared somewhat confused and gave typical "réponses à côté"; e.g. that two plus six was seven, after long thought; that the month (October) was December, then November; that a paper was a book; and when asked to close his eyes, he drew the lids down with his fingers. Features characteristic of aphasia and agnosia were also

apparent; iteration, agrammatism, paraphasia, perseveration and inability to name objects presented tactually or to repeat simple melodies and rhythms. Questions relating to his offence were met with negative replies. This man was sent to prison, and when seen by the authors four months later he performed all the tests correctly and rapidly; his amnesia for the offence had cleared up, to be replaced by amnesia for the Ganser state. The discussion about "la pensée symbolique", with its far-fetched interpretations and generalizations on the basis of unstandardized drawings and questions, is better passed over.

Daumézon, Koechlin and Paumelle (1952) confirm that relevant publications in French have been rare. They too tell us that most cases are found in prisons. They regard it as essentially an affective disturbance (outside of schizophrenia) where the patient has some interest in the situation. Their case is one of a post-menopausal depression with hysterical features in a woman of forty-eight who had recently undergone an operation for gall-stone. She had made an attempt to kill her husband and herself. She was negativistic and said she wanted to die. She inflicted injury on herself by injecting hot water into her vagina and then accused her husband—by whom she entertained ideas of being deceived—of this. She was exhibitionistic in the way she later displayed her vagina for examination. A few days after admission she showed disturbed consciousness, did not know her name or age and gave approximate answers, e.g. that snow was red, coal green and grass white; two plus two was fifteen. Under drugs, she had vivid hallucinations and talked about childhood experiences, but she parried questions concerning her present situation with ridiculous answers. The next several weeks saw variations in this pattern; when the conversation turned on her recent life her attitude changed and there was a regression to Ganser responses. With treatment of the burn, her mental condition improved. She had hallucinated a woman who told her that her husband had another woman friend, which she said was not true: this was evidently a mechanism of exculpation from her attempted homicide and suicide, which was followed by the mechanism of "mental illness" in the Ganser state.

Sarteschi (1953) cites some earlier work in Italian and tries to restrict the connotation of Ganser state to a situational psychosis on a hysterical basis with a "constitutional, pathological, oligophrenic background"; again, it is regarded as a conscious simulation, which disappears when its object has been achieved, found only in prisoners, civilian and military, and in persons seeking compensation for accident. He states that it is becoming increasingly frequent. This viewpoint is manifestly inadequate. Having dealt in a previous paper with the clinical aspects, Sarteschi is here concerned with the medico-legal aspects, in particular the vexed question of responsibility—which is dealt with by one of the present writers elsewhere (Macdonald, in preparation).

PSYCHOPATHOLOGY

If we turn to a dictionary of psychology or of medicine for information, we find that the Ganser Syndrome occurs "in hysteria or malingering" (Harriman, 1947); that Ganser's Symptom is seen "in certain psychotic conditions" yet that Ganser's Syndrome is "generally of hysterical origin" and is "called also acute hallucinatory mania" (Dorland and Miller, 1942). The latter source also refers to the "simulation" of hallucinations in hysteria and defines simulation as both "malingering" or counterfeiting a disease and the "imitation" of one disease by another. Ganser, however, stated that his patients were hysterical and not malingering, and that they may or may not have had a psychosis in addition; but it is evident that the responses in such patients

have a motivation near to the level of awareness—as evinced by both the nature of the answers and the reactions under drugs—and that a continuum may be formulated from the brazen deception of the malingerer to the helpless confusion of the psychotic. In Karpman's (1926) view, "contrary to the generally accepted popular notion, malingering should not be regarded as wilful and conscious lying on the part of a well-balanced individual, but rather as quite an unconscious defence reaction in one who, already burdened with constitutional defects and many psychogenic difficulties, is a psychically ill individual, and who, unable by reason of these defects and burdens to handle a situation in an adequate manner, seeks in malingering an avenue of escape from the situation". Whether we agree with this formulation or not, the important thing is the fact that malingering, by its very infrequency of occurrence, is abnormal behaviour demanding psychological explanation and treatment. The attitude common among both lay and medical persons towards the malingerer is one derived from the theological and metaphysical residue of "Free Will", which still clutters up discussion of deliberateness and responsibility; implicitly or explicitly, the patient's "freedom of will" is assumed in those cases where he is regarded as "deliberately" deceiving and the patient is viewed as a culpable person—the same attitude prevails, to a lesser extent, towards hysteria. Several authors have pointed up the difficulty of distinguishing between hysteria and malingering. Cameron (1947) states that "no matter what symptoms are being investigated, the differentiation between hysteria and malingering must finally rest upon the criterion of self-deception. If the patient accepts and believes in his symptom as evidence of disability or disease, we must accept and believe in him as an hysterical patient; if he does not, we must consider him a malingerer. The trouble is that, while there are many cases which are either one or the other, there are many others in which pretence and self-deception are so intermingled as to make clear distinction impossible." Hall (1949) remarks that "differentiation is apt to be influenced by the psychology of the observer, but, whatever the decision, it will be agreed that the patient's behaviour represents a departure from normal standards", and adds that "a malingerer will naturally do his utmost to conceal his intention, this is not always true of the hysteric since the latter, once his pretence has been exposed, will derive equal morbid satisfaction from at least having drawn attention to himself by that means".

The Ganser state, then, may be regarded as in a position intermediate between malingering and hysterical states of more unconscious motivation. The four general features, one or more of which are likely to be seen in the symptomatology of hysteria, whatever form it may take, according to Skottowe (1953), are: "(i) The symptoms are an imperfect representation of the condition that they resemble. (ii) The symptoms correspond to the mental image that the patient might be expected to have of the illness or emotional state or role in life which is resembled. (iii) The immediate syndrome, or the long-term general attitude and behaviour of the patient, can be seen to serve some gainful purpose for him . . . (iv) Careful history-taking will generally show a previous clearly hysterical attack, though not necessarily in the same form, and hysterical traits of personality." It will be seen how neatly these criteria apply to the Ganser patients: the symptoms are an imperfect representation of a confusional psychosis, they correspond to the patient's "notion of insanity" (Lewis, 1946), they serve him some gainful purpose in entailing diminution of responsibility and attraction of attention, and in his previous history some indication of hysterical temperament or of other hysterical symptoms is likely to appear. As

in the fugue there is evasion by getting rid of the self through massive dissociation, so in the Ganser state there is evasion by saying the self is here but it is mad. "The wish to be insane and to appear irresponsible is fulfilled *through* the Ganser state which is a mental disease", says Bleuler (1951). It might be postulated that in difficult situations those of hysterical bent, who have not had the opportunity to "learn" the symptoms of other patients, physical or psychological, through observation, develop a Ganser state.

Disturbances of consciousness range from the coma through the various degrees of delirium to the mildly clouded or "twilight" states and conditions bordering on full awareness. The twilight state, says Bleuler (1951), "suggests especially a *systematic* falsification of the situation"; there is sense and a more or less logical connection in the acts. Onset and termination are often most sudden and duration is rarely longer than a few days. The oriented (automatisms and fugues) are less frequent than the disoriented, which have "a certain coherence, which might be compared with a dream" although "thinking is not clear or it may even be confused"; "the connection with the outer world is altogether interrupted or falsified by illusions and hallucinations of the visual and auditory types, especially the former" and these may lead to acts such as rape and murder. Some of the twilight states, he says, have a definite purpose, e.g. the Ganser. Other syndromes he distinguishes are: the buffoonery syndrome, playing the fool in the "vulgar" sense; hysterical puerilism, a regression to the behaviour of early childhood; and hysterical pseudodementia, "knowing nothing".

Sometimes quoted as stating that the Ganser states are "acute syndromes based on a chronic schizophrenia", Bleuler, made a distinction between the hysterical and the schizophrenic states, observing that the latter might extend over a period of months and generally could not be influenced. It is not clear whether he meant here that he considered there was a schizophrenic state resembling the Ganser state or whether he meant merely that a Ganser state could co-exist with schizophrenia in the same patient. At any rate, we may now regard Ganser as distinguishable from schizophrenic phenomena; and it is evident from his discussion of disturbances of consciousness that Bleuler believed that twilight states, including the Ganser, could be produced on a neurotic, psychotic, organic or psychopathic basis. With reference to "the characteristic, evasive answers common to both diseases" (1950) he contrasts the hysteric's systematic effort consistently to avoid giving the correct answer with the hebephrenic's giving of the first answer that comes to mind; the latter may show negativism, as does the hysteric, but this will be expressed in his entire attitude. He notes, too, that it is not only the schizophrenic who can respond rapidly with evasive answers. To the present writers, it seems that the approximate answers of the Ganser are quite distinct from the "off-centre" definitions given by some schizophrenics (e.g. definitions of a young schizophrenic seen by us: cedar—"bark"; brim—"ceiling"; guillotine—"axe"; nail—"thorn—I don't care for that too much—bag": that might seem a queer association (?) the idea of a bag of nails").

Ganser responses are also distinguishable from those of organic dementers. Aubrey Lewis (1946) points out that "the most characteristic thing is the disparity between the patient's alleged deficiencies and his general alertness: he says he does not know anything about his own past, he cannot read or spell or do the simplest arithmetic, and yet he may be behaving quite naturally and adapting himself to the situation in a way which would be inconceivable if he had actually so advanced a dementia". Inconsistencies of response are characteristic of this state. Contrasting "hysterical" with "affective" symptoms, Curran

and Guttman (1949) remark of the former that "they are not typically so persistent; they are very much more modifiable by environmental changes and measures. They are not symptoms which are in any sense impersonal, and any changes in the attitude of the patient is invariably reflected in them at once. Hence their tendency to fluctuate in intensity according as to whether or not the patient pays attention to them, which accounts for their apparent inconsistency." Frequently both types of symptom co-exist (cf. case reported below).

We may end here with a note on the mystery of the incidence of this disorder. We may not agree with Wertham's (1949) pronouncement that "a 'Ganser reaction' is a hysterical pseudostupidity which occurs almost exclusively in jails and in old-fashioned German psychiatric textbooks" and that "it is now known to be almost always due more to conscious malingering than to unconscious stupefaction", but there is a discrepancy between the number of cases and estimated frequency of occurrence reported in the older German literature and those reported in the English literature since then. Further, as we have tried to demonstrate, most of the cases described have been inaccurately designated as Ganser states. Another psychiatrist much experienced in prison work, Karpman (1926), writing on prison psychoses almost thirty years ago, asserted that the reactions of prisoners awaiting trial might be more acute than those of others but that there was nothing specific to separate them from other types of prison reaction: this suggests that he had not seen any Ganser states, for the approximate and ridiculous answers constitute a quite distinctive feature. Several prison psychologists, with many years' experience in prisons and hospitals between them, have been approached by the present writers and they have been able to report only one, rather doubtful, instance of such a condition. According to Noyes (1939), "Bearing in mind its psychological purpose it will be seen that the appearance of a pseudo-dementia in an accused but as yet unconvicted person is equivalent to a confession." This, of course, is a deduction from a psychopathological hypothesis which needs further testing by reference to fact established on other evidence. Kretschmer (1934), who described the state as one "produced with scarcely any change of consciousness . . . a condition on the borderline of malingering", said that during the (1914-18) War cases were reported of "efficient, tough-fibred" soldiers reacting to terror, such as that arising from the death of their nearest comrades, with "twilight states of short duration", in which they exhibited "a kind of pseudo-dementia or Ganser syndrome"; but we are not given any more information about these: nor does the more recent war appear to have produced a crop of them.

On the problem of incidence, we can only conclude that this is a very rare condition, since frequency of occurrence is presumably correlated positively with frequency of report and since the few reports include several false ones. Another problem is whether the Ganser state ever occurs by itself or only in conjunction with some other disorder. It is scarcely tenable, as Stern and Whiles imply, that Ganser failed to see any psychosis in more (perhaps many more) than twenty psychotics; nor is it plausible, as Lieberman opines, that in Ganser's day there was a "pure" state which has become corrupted now. It will be observed, however, that all of the cases reported since the early German literature appear to have had some kind of psychosis in addition to the Ganser state.

CASE REPORT

Previous History

The patient examined by the present writers was a dock labourer of sixty-two, admitted to hospital in January 1954, certified. There was no family history of mental illness. The patient, G., had had a normal childhood and his previous health had been excellent. At

twenty-nine he had married a woman of his own age and his relations with her had always been harmonious, although they had no children. His wife described him as being a jovial person, fond of company, moderate in his smoking, drinking and gambling; a dabbler in house decorating and gardening. For forty years he had been working in the docks where he was regarded as a conscientious worker.

In November 1953 a newly-appointed shop steward undertook to check the dock workers' union cards to see whether they were fully paid up—a duty which his predecessor had neglected to perform. This check-up was to be carried out at the dock gates one morning, and on this occasion G., having failed to pay his dues for many years, absented himself from work in the knowledge that men had been suspended from work for such pecuniary default and that such a penalty for one of his age would be disastrous. It was then that he first complained of lower abdominal pain, diagnosed by his G.P. as gastro-enteritis. This illness kept him from work for five weeks when, although his abdominal symptoms disappeared, he developed what his doctor described as "nervous debility"; he appeared to worry excessively and to be unable to concentrate. At the end of this period, when his doctor was encouraging him to go back to work, he divulged to his wife for the first time the reason for his worry: he owed his union over £15 (at the rate of 8d. per week). His wife drew from her savings and paid this amount for him at the local branch of the union, where it was duly receipted in his union book. This brought on remorse that he had to rely upon his wife, having gambled away all his spare money.

Towards the end of December G. returned to work, but he became progressively more depressed, fretted needlessly and avoided company. The following Monday he came home with his clothes soaked: he said that he had fallen into the river and admitted that he had not gone to work because that was the day when the union dues were collected and he was afraid of what his comrades would say when they heard that he had a receipt for over £15 in his book. The events of this day are not clear, but it seems likely that he had a fugue. He remembers crossing the road near his home and being seized by a fear that he was going to be run over. Then he recalls being on the bank of a stream in a park, where he had a vision that he was being hanged; he also had the taste of burning paper in his throat. He must have lost consciousness at this point for the next thing he recalls is lying on the ground and realizing that he had been doubly incontinent. He threw himself into the shallow stream but a park attendant fished him out and threatened him with the police if he ever saw him there again. He then returned home.

Next day he went back to work, paid his week's union dues and procured a new book so that nobody would see the £15 receipt. Nevertheless, his depression deepened; he lost sleep and he was unable to apply himself to things. His wife recognized that he was ill and kept him at home. The night prior to his admission he became quite distraught, roamed the house, woke up his wife and told her that she had become mad because of his misdoings. In the morning he was found in an extremely agitated condition, scribbling letters, and he gave good indication that he intended to commit suicide. At one moment he said that his wife was missing, and the next that he was going to kill her as she was "mental". He had written the following letters:

"To my wife.

She has been the best in the world and I have been the worst coward I know this will mean me to go to the gallows which is too good for cowards like me So please show this to the police if you don't I will end it all.

Coward."

"For Gods sake.

Hand me over to the police If you don't You do not understand your job as I have worry my wife she is mental If you dont I will End her life and my own."

Present State

On admission G. was observed to be a red-faced sthenic individual with arteriosclerosis and a B.P. of 180/100. His EEG was normal. He showed all the symptoms of a classical agitated depression. He was depressed, tense and preoccupied, agitated and tremulous, taking no interest in his surroundings and unable to apply himself to the simplest tasks. He slept only with heavy sedation, and he refused to eat as he considered it a waste of time for he was due to be hanged. He complained of constipation which caused him terrible headaches. He complained of vivid, frightening dreams which depicted all the wrongs committed by him during his lifetime, and he had ideas of reference, thinking that people were calling him a "dirty tyke" and other names. Once, he said that the police were after him, and another time, that he was in prison waiting to be hanged because he had killed his wife. He had symptoms of derealization: the world appeared dull and strange, his house and garden looked terrible (reported by the social worker to be the brightest in a dingy street). He had olfactory, auditory and visual hallucinations; he complained of a horrible smell of burning paper at the back of his throat; he heard men's voices saying that he was a wicked man and threatening to kill him; occasionally he saw these men, his workmates and the police, adopting malevolent attitudes towards him. He constantly worried the hospital staff to hang him right away as it would be a waste of time to give him a trial.

Psychological Testing

G. was referred to the Psychological Department not as a diagnostic problem—he was considered to be a common case of involutional depression at the time—but for purposes

of the psychologists' own research. In view of the peculiar behaviour observed, the tests first administered (five days after admission) were not carried through to their conclusion in standard fashion, but more extensive testing was carried out later.

Progressive Matrices (1938). Oral. 12.i.54. Grade IV/V.

On Set A, the first three and sixth items were correct; on B, the first two correct, discontinued after the sixth; on C, none of the first three correct, then discontinued; on D, the first incorrect, testing discontinued.

On this test, the lower 20 per cent. of the population in this age group does not appear to score at better than chance level.

Perseveration was noted: a run of three "2"s and one of three "4"s.

Mill Hill Vocabulary (2 Jr. B). Oral. 12.i.54. Grade V. Score zero.

Examples of response: rest—"past, fire, fire"; patch—"pitch, flitch, flitch"; blaze—"walk, walk, walk"; ache—"walk, I said, walk, didn't I—can't put one for that, sir"; rage—"torment"; shrivel—"burning"; schooner—"aeroplane"; squabble—"friendly, friendly"; liberty—"tightening up"; courteous—"enemy".

Note: Klang associations, "near misses" or near associations, near-opposites and tendency to perseverate.

Re-test (*Definitions* 1948). Oral. 25.i.54. Grade IV. Score 23.

Examples of response: cruel—"be kind to people"; courteous—"row with people"; dwindle—"increase in power"; disturb—"going out for a—enjoyment"; view—"go out (?) like with anybody"; mingle—"you go out for a ride, mingle with the crowd"; fascinated—"kind of pleasure (?) you only go out for pleasure, mingle with the crowd, and you get enjoyment from it".

Note: Still some near-opposites and a tendency to perseverate, but absence of the more abnormal kinds of response; thus there is inconsistency between test and re-test in both the scores and the kinds of response.

Miscellanea. 12.i.54.

Mental Arithmetic: 0 out of 4. E.g. $7+3=$ "9, no—19".

Counting: from 1 to 20, about 12 errors.

Alphabet: 15 to 20 errors in reciting.

Days of the week: 5 errors.

Date: "Sunday today—December 29th—28th—1942—1943."

Time: unable to tell the time.

Agnosia tests: visual presentations: a fork is called a "shovel", a padlock "part of a motor bike", a shoelace "part of rope", two keys "two bells";

Tactile: comb is "part of cigarette lighter", spoon "part of motor bike horn";

Auditory: coughing is "writing a letter", whistling "humming a song", clapping "scratching paper", foot scraping "tearing paper up".

Digits: Forward, 3; Backward, 2.

Note: Again, near misses and a tendency to perseverate. Re-test, 25.i.54.

One or two errors less in each "sub-test"; similar peculiarities, e.g. $7+3=$ "11—er 12".

Wechsler-Bellevue I. 20.i.54.

Verbal I.Q.	..	..	75	Full Scale I.Q.	..	..	68
Comprehension	..	..	5	Performance I.Q.	..	..	<63
Arithmetic	..	..	0	Picture Completion	..	..	0
Digit Span	..	..	3	Picture Arrangement	..	..	1
Similarities	..	..	2	Object Assembly	..	..	0
Vocabulary	..	..	5	Block Design	..	..	1
				Digit Symbol	..	..	1

Vocabulary: absence of the above-mentioned peculiarities.

Arithmetic: one near miss.

Picture Completion: near misses, e.g. No. 1 "Hair" (E: "Anything else missing?") "The neck" (E: "Here—you see, the nose is missing.") "No, the nose is here." (E: "But you see this part of the nose is missing.") "I don't think so."

Object Assembly: near misses, e.g. at one point he had all but one of the hand pieces correct, then he rearranged it and presented it with fingers all askew and only two pieces correct.

Block Design: near misses, e.g. on No. 1 he had only one piece with the wrong face up, and this he turned over a few times, but the correct face did not turn up and he presented it as it was.

Digit Symbol: near misses, 6 of the 11 entries made being wrong. (The great majority of people do not make any error on this test, which is mainly one of speed.)

Benton Visual Retention (A). Score 1 (?) Defective. 20.i.54.

Several near misses; perseveration.

On No. 3 a remark made suggested that he had seen the peripheral figure although he did not try to draw it, despite instructions.

Re-test (B). Score 0. Defective. 25.i.54.

Nos. 1 to 4 were near misses.

Bender-Gestalt Z. Score 119, i.e. $+6.9$ S.D. 20.i.54.

The Z score does not give a specific diagnostic indication but yields a probability

amounting almost to certainty that the subject is suffering from severe psychological illness, i.e. with behaviour so deviant that hospitalization is necessary.

This was administered just after the Benton (A), in which there had been perseveration of pencil strokes throughout (in addition to the perseveration of figures mentioned above); instructions in the Bender prohibit "sketching" and in this case there was no such perseveration, showing that it had been under voluntary control.

The peculiarities contributing to the abnormally high score were rather arbitrary and inconsistent with previous drawing: No. 3 showed perseveration of dots, but this did not appear in any other figure; in No. 5 the extension had an apparently arbitrary bend; in others, the right angles and hexagons copied with the design before him were worse than those drawn from memory in the Benton.

Porteus Mazes. 12.i.54.

The first maze only was given. This was traced with a rapidly oscillating hand—a quite voluntary movement, as judged by both its own character and comparison with subsequent drawing—producing a series of loops or strokes giving the effect of a shaded pathway.

Rorschach. 20.i.54.

R 31 T/R 1.5" P 5 F+ per cent. 63 A per cent. 45 Last three per cent. 51 W per cent. 16 D per cent. 78 Dd per cent. 6 1M 1FM 1Fm 1Fk 19F 3Fc 4FC 2CF.

In general, the scores are within normal limits and there is not a significant number of neurotic or organic "signs". The pattern and content suggest a fairly normal "extra-tensive" personality of average intelligence (findings consistent with previous history).

However, there is a discrepancy between the borderline-defective level on intellectual tests and the low-average level indicated by the Rorschach record (and previous history) which points to impairment. This is evidently functional in nature from the test results in general and the inconsistencies in particular.

Further, there is an anomaly reflected in the rather low form-level of the responses, which became apparent not during the administration but during the enquiry: what had seemed to be quite usual responses turned out to be usual in content for the particular card but unusual in the part of the blot selected—again, near misses. E.g. in No. III, not the large details but only part of them were seen as men, giving the effect of distorted men with arms bigger than their legs. In the case of this response, it was also apparent that what was seen was at least momentarily withheld: before stating that he had seen any men he said, "Here, like footballs here, each got a football, haven't they". These features, together with the emphasis on colour, are consistent with a diagnosis of a hysterical reaction of the Ganser type.

Course

After only three modified E.C.T.s, the patient made a rapid and complete recovery.

He appeared to be and said that he was happy, and he made himself useful in the ward. He was full of thanks for all that had been done for him and of good intentions of becoming a model husband. During the period of his improvement, when asked how much he had owed his union he said that it was £6: when it was suggested to him that the figure was in fact larger, he admitted to £8 only; a week later, he admitted to further questioning that it had been about £15. His memory of the first week or two in hospital became very vague, and he had no recollection of his Ganser responses.

Six months later he was still well.

DISCUSSION

This case may be classified as an involutional depression partly reactive to an environmental stress, with a Ganser state reactive to a delusion. The crisis involved in the check-up on union payments, which the patient had allowed to lapse, resulted in somatic complaint, followed by psychological disturbance which developed from "nervous debility" through a fugue episode into an agitated depression. Feelings of unworthiness and guilt heralded a state of delusion, on hospitalization, when he saw himself as in prison awaiting trial for the murder of his wife. The Ganser state then blossomed forth in its brief flower, an essay at absolution, to protect self-esteem as well as self. E.C.T. may have played a part in breaking up this state as well as the depression; the speedy recovery after only three treatments underlines the hysterical element present.

In performance on psychological tests administered in the second and third weeks after admission, depression was completely obscured and the picture presented was one which would be expected in a Ganser state: "near misses" (Mill Hill Vocabulary, Wechsler-Bellevue, Benton Visual Retention, Agnosia

tests, Rorschach); inconsistencies (Mill Hill Vocabulary—between test and re-test, both quantitatively and qualitatively; between intellectual tests and Rorschach; Benton and Bender drawings—inter- and intra-test); perseveration (Progressive Matrices, Mill Hill Vocabulary, Benton Visual Retention—manifestly voluntary, Agnosia and other tests); consciously made errors (Wechsler-Bellevue, Benton Visual Retention, Porteus Mazes). The most unstructured test, the Rorschach, gave no diagnostic pattern but the picture of a fairly normal personality of low average intelligence: there were, however, "approximate" responses and an emphasis on colour consistent with a hysterical state of the Ganser type.

SUMMARY

An attempt has been made to dispel some of the misconceptions popularly held concerning the Ganser state, particularly those of "Vorbeireden", simulation, frequency in prisons and elsewhere and relation to other disorders.

It has been defined as a very uncommon, hysterical disturbance of consciousness of short duration and fluid character, marked by approximate and ridiculous responses to question and command, corresponding to the layman's imperfect notion of madness. Disorientation, hallucinations and lack of insight are characteristic. The state may recur and is dissociated from normal memory. It is precipitated by a situation where the patient would derive benefit from a lessening of his responsibility. A hysterical element is generally apparent in the patient's previous history. (All the cases reported in English appear to have had some psychosis in addition to the Ganser state.)

It has been contended that most of the dozen or so cases reported in English do not in fact warrant the description of Ganser state.

A case with some hitherto unreported features has been described, and psychological test results have been given.

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REFERENCES

- ANDERSON, E. W., and MALLINSON, W. P., *J. Ment. Sci.*, 1941, **87**, 383.
 BENDER, L., *J. Nerv. and Ment. Dis.*, 1934, **80**, 32.
Idem, *A Visual Motor Gestalt Test and its Clinical Use*, 1938. New York, American Orthopsychiatric Association.
 BLEULER, E. P. (trans. Brill, A. A.), *Textbook of Psychiatry*, 1951. Reprint. U.S.A., Dover Publications.
Idem (trans. Zinkin, J.), *Dementia Praecox, or the Group of Schizophrenias*, 1950. Reprint. New York, International Universities Press.
 CAMERON, N., *The Psychology of Behaviour Disorders*, 1947. U.S.A., Houghton Mifflin Co.
 CURRAN, D., and GUTTMANN, E., *Psychological Medicine*, 1949. Edinburgh, Livingstone.
 DAUMÉZON, G., KOEHLIN, P., and PAUMELLE, P., *Annales Médico-Psychologiques*, 1952, T.1, 110^e Année, 427.
 DAVIE, T. M., *J. Ment. Sci.*, 1942, **88**, 449.
 DORLAND, W. A. N., and MILLER, E. C. L., *The American Illustrated Medical Dictionary*, 19th Edn. 1942. W. B. Saunders Co.
 FLATAU, G., *Zeitschrift für die gesamte Neurologie und Psychiatrie*, 1913, **15**, 122.
 GANSER, S. J., *Arch. f. Psychiat. u. Nerven.*, 1898, **30**, 633.
Idem, *Ibid*, 1904, **38**, 34.
 HALL, S. B., *Psychological Aspects of Clinical Medicine*, 1949. London, H. K. Lewis & Co.
 HARRIMAN, P. L., *The New Dictionary of Psychology*, 1947. New York Philosophical Library.
 KARPMAN, B., *J. Nerv. and Ment. Dis.*, 1926, **64**, 331 and 482.
 KRETSCHMER, E. (trans. Strauss, E. B.), *Textbook of Medical Psychology*, 1934. Oxford University Press.
 LAING, R. D., *J.R.A.M.C.*, 1953, **99**, 169.
 LEWIS, A., *Psychological Medicine in Textbook of the Practice of Medicine*, 1946. Ed.: F. W. Price.
 LIEBERMAN, A. A., *Illinois Medical Journal*, 1945, **88**, 302.
Idem, *J. Nerv. and Ment. Dis.*, 1954, **120**, 10.
 MACDONALD, J. E., *The Concept of Responsibility* (in preparation).
 NOYES, A. P., *Modern Clinical Psychiatry*, 1939. London, W. B. Saunders & Co.
 RIESE, W., and REQUET, A., *L'Encéphale*, 1937, XXXII, 209.
 SARTESCHI, P., *Rivista Sperimentale di Freniatria*, 1953, LXXVII, 159.

- SKOTTOWE, I., *Clinical Psychiatry*, 1953. Eyre & Spottiswoode.
STERN, E. S., and WHILES, W. H., *J. Ment. Sci.*, 1942, **88**, 134.
WERTHAM, F., *The Show of Violence*, 1949. London, Gollancz.

TEST REFERENCES

- BENTON, A. L., *A Visual Retention Test for Clinical Use*, 1946. New York, Psychological Corporation.
FOULDS, G. A., *Brit. J. Psych. (Gen.)*, 1951, **42**, 209.
KLOPPER, B., and KELLEY, D. M., *The Rorschach Technique*, 1946. New York, World Book Co.
PASCAL, G. R., and SUTTELL, B. J., *The Bender-Gestalt Test*, 1951. New York, Grune & Stratton.
RAVEN, J. C., *Guide to Using Progressive Matrices* (1938), 1950. London, H. K. Lewis & Co.
Idem, *Guide to Using the Mill Hill Vocabulary Scale with Progressive Matrices* (1938), 1950. London, H. K. Lewis & Co.
WECHSLER, D., *The Measurement of Adult Intelligence*, 1944. Baltimore, Williams & Wilkins.

THE NATURAL HISTORY OF MENTAL DISORDER IN OLD AGE

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INTRODUCTION

OUR classification of the mental disorders of later life, which are becoming a social and medical problem of increasing magnitude, is still based upon the views of the great descriptive psychiatrists of half a century ago. Most of the classical accounts of mental disorder of old age (Kraepelin, 1909; Bleuler, 1916) confine themselves to the pre-senile, senile and arteriosclerotic psychoses. Their writers evidently regarded other illnesses as numerically insignificant in relation to these degenerative disorders peculiar to old age. Cases with a predominantly depressive or paranoid picture or with clouding of consciousness alone were described in these old accounts, but were attributed to an underlying cerebral illness, either of senile or arteriosclerotic type. It is consequently a long-established practice when such symptoms appear for the first time in old age, or occur in senescence after prolonged remission, to search for neurological signs, or for some evidence of a decline in intellectual efficiency which might account for the illness in terms of organic disease of the brain. Weight is thus often given to clinical findings of a quite subtle character, or the results of "deterioration tests" whose value in the early diagnosis of degenerative processes in the brain is unproven, form the basis of conclusions of doubtful validity.

A closer scrutiny of the old system of classification has also become necessary on account of the success of physical treatment in some mental disorders of old age and because of the doubt cast by recent findings upon the specificity of some of the pathological changes traditionally associated with mental illness in the old; these developments have raised aetiological and prognostic questions of a fundamental kind (Roth and Morrissey, 1952). Finally, the clinical picture and natural history of illnesses are liable to change, as are also our views as to where the lines of demarcation should be drawn as observations accumulate over the years. There is little doubt, for example, that our views about the prognosis of some forms of mental illness have undergone a gradual, and to some extent imperceptible transformation in the light of some 20 years' experience during which physical treatments in psychiatry have been extensively used.

In a previous investigation evidence was adduced from a study of the case records of patients admitted to a mental hospital in 1948 to suggest that patients whose presenting illness began with predominantly depressive or manic symptoms (affective psychosis) and patients with a steadily progressing disorganization of intellect and personality (senile psychosis) belonged to two distinct nosological groups with sharp differences in pattern of outcome. Two and a half to three years after admission, almost 90 per cent. of cases diagnosed "senile psychosis" were dead, while over two-thirds of patients classified as

"affective psychosis" were out of hospital, the majority of them in remission, and less than a quarter dead; the discrepancies were marked in each age group. Moreover, affective disorder unexpectedly accounted for more than half the total number of admissions.

Three other diagnostic categories, arteriosclerotic psychosis, acute confusion, and paraphrenia, into which patients in this 1948 material were classified, each contained too few patients for any clear pattern in their natural history to emerge. To seek further evidence about the affective and senile psychoses and to examine the pattern of outcome of the three other disorders, it was necessary to extend the investigation to a larger material. Case material for 1949 and for two years prior to the introduction of convulsive treatments at this hospital, 1934 and 1936, was therefore added to that already studied to establish whether the five disorders hypothetically differentiated were in fact characterized by distinctive patterns of outcome.

DEFINITIONS AND HYPOTHESES

The categories into which the patients in this study were classified will now be described, together with the hypotheses which led to the differentiation of some of these categories as distinct nosological entities.

Affective Psychosis

In this category were classified all cases whose admission to hospital had been occasioned by a sustained depressive or manic symptom-complex. Our main hypothesis was that cases of mental disorder in old age commencing with such predominantly affective symptoms were distinct from the cerebro-degenerative processes of the senium: contrary to what was taught in most of the classical literature they were unlikely to be prodromal features of senile or arteriosclerotic psychosis since termination in dementia was rare. To ensure that no subjective bias had entered to restrict artificially the concept of affective psychosis all cases in which the affective symptoms were a prominent, consistent feature of the presenting illness were included in this group. This meant that not only did we ignore minor intellectual defects such as mild memory impairment for recent events, partial disorientation or clouding of consciousness in the acute phase (which we were hypothetically regarding as largely irrelevant to the prognosis and aetiology of the affective illness), but also evidence of impairment of intellect and personality, unless these were part of an unequivocal progressive cerebral disease, symptoms of which had been present since the beginning of the illness.

Now, if the hypothesis is erroneous and affective psychoses in old age are to a considerable extent like senile and arteriosclerotic psychosis manifestations of cerebral degenerative processes, we should not expect significant and consistent differences in pattern of outcome between the first of these disorders on the one hand and the last two on the other. Thus, for example, if affective disorder is often merely an earlier stage of the process that terminates as senile or arteriosclerotic psychosis, we should expect any differences in outcome in earlier age groups to become blurred with increasing age and also to diminish or disappear after long periods of observation. On the other hand, differences in the fate of patients with these diseases that are largely independent of age and sustained for relatively long periods would suggest that affective psychosis in old age is to a large extent aetiologically distinct from the cerebral degenerative processes.

Senile Psychosis

Senile psychosis was here defined as a condition with a history of gradual and continually progressive failure in the common activities of everyday life and a clinical picture dominated by failure of memory and intellect and disorganization of a personality, where these were not attributable to specific causes such as infection, neoplasm, chronic intoxication or cerebrovascular disease known to have produced cerebral infarction.

Late Paraphrenia

The patients classified in this group were those with a well-organized system of paranoid delusions with or without auditory hallucinations existing in the setting of a well-preserved personality and affective response. Previous clinical observations had made it clear that in the great majority of these patients, the illness commences after the age of 60. In view of this, and also because the clinical picture of most cases has many similarities to the paranoid illness described by Kraepelin under the heading of paraphrenia (later shown to be a relatively late form of schizophrenia) the name "late paraphrenia" was given to this group in place of schizophrenia, which had been used in a previous paper. That many patients with paranoid psychosis in old age are well preserved in the early stages of their illness has been previously recognized (Bumke, 1936). But such cases have been regarded as paranoid varieties of senile psychosis, on the assumption that the eventual outcome was one of gross disintegration of the intellect and personality. Transient ever-changing paranoid ideas arising from lack of grasp and poor contact with the environment are, of course, seen in the organic psychoses proper. Our hypothesis required only that conditions in which a system of paranoid delusions was the first and only sign of illness followed a course distinct from that of the senile and arteriosclerotic psychoses. However, to put this hypothesis to the most stringent possible test all cases in which a paranoid delusional system was the most prominent feature of the illness were included with late paraphrenia.

Arteriosclerotic Psychosis

Patients classified in this group were those (1) in whom dementia was associated with focal signs and symptoms indicative of cerebrovascular disease, or (2) in whom a remittent or markedly fluctuating course at some stage of the dementing process was combined with any one of the following features; emotional incontinence, the preservation of insight, or epileptiform seizures. These are all among the generally accepted criteria for the diagnosis of arteriosclerotic psychosis. The importance attached to evidence of cerebrovascular disease requires no explanation. A fluctuating or remittent course was made a leading criterion because of the consistency with which it presents as a feature of dementing processes associated with established cerebrovascular occlusion. It is of some interest in this connection, that in cerebral thrombo-angiitis obliterans, a disease of middle age in which there can be no doubt about the relevance of the cerebrovascular changes ("normal ageing" being an unlikely cause), fluctuation is a striking and consistent feature of the clinical picture (Mayer-Gross, Slater and Roth, 1954). The diagnosis was, however, made conditional upon the presence of one of three subsidiary criteria in addition to fluctuation so as to provide some further guarantee that the underlying degenerative process was likely to be of a focal or patchy rather than of a diffuse character as in the case of senile psychosis. But it is realized that as far as the second group of criteria

is concerned, classification with arteriosclerotic psychosis is based on a hypothesis that requires substantiation by follow-up investigation and pathological study of the brain in those cases that come to autopsy. The status of these cases will require reconsideration in the light of this evidence.

Acute Confusion

This was defined as any condition of rapidly evolving clouding of consciousness produced by some extraneous cause or appearing for no discoverable reason, and occurring neither in a setting of definite dementia, as far as could be judged from the patient's level of adjustment to the demands of daily life, nor as a complication of one of the other diseases defined above. That the prognosis for the attack in cases of acute clouding of consciousness may be favourable is generally accepted. But it is widely believed that such an attack usually represents a first indication of a reduction in the reserve capacities of the brain likely to become manifest subsequently as senile or arteriosclerotic psychosis. Our hypothesis was that acute confusion, whether due to a specific toxic infective or metabolic factor or to no identifiable cause, was a phenomenon distinct from these degenerative processes. The justification for grouping together disorders associated with chest infection, surgical operations, cardiac failure, pernicious anaemia and non-specific causation was that there were basic features in the clinical picture common to them all. Where clouding of consciousness occurred as a complication of an acute affective or paraphrenic psychosis the cases were classified with the appropriate main disorder. Previous attacks, unless they had been associated with definite evidence of cerebral infarction or were disturbances seen in the setting of an unequivocal dementia, did not disqualify patients from inclusion in this group.

Other Disorders

The expectation from our previous work was that cases not falling into any of the five categories described so far would be few in number and it was decided to place them in a miscellaneous group under the above heading.

METHOD

A total of 472 patients had been admitted during the years 1934, 1936, 1948, and 1949 and the case records of 464 were found and investigated. The classification of each case was decided on the basis of the history and clinical picture of the illness that had necessitated the most recent admission to hospital and according to criteria which have been described. When the cases had thus been separated into clinical groups, the outcome of the illness was investigated by (1) a further examination of the case records, (2) a follow-up study of each discharged patient, (3) a detailed clinical and psychological investigation of each patient who was not discharged from hospital at the time of survey. The follow-up study consisted of a visit to the house in the majority of cases by the psychiatric social worker attached to the research unit. Wherever possible a near relative as well as the patient was interviewed during the home visit. A small proportion of patients had moved away from this area. Where, for this or other reasons, a visit had not been possible to arrange, a letter was sent to the nearest relative who was invited to answer questions about the patient's present health, activities and progress during the period since discharge from hospital and provide any information about relapses and admissions to other mental hospitals. In this way it was possible in the great majority of cases to build up a detailed picture of the patient's condition and level of adjustment.

This information will be published elsewhere in full. Here we shall mainly concern ourselves with the status of each patient in respect of the categories of "discharged", "in-patient" and "dead" at 6 months and at 2 years after admission to hospital, with the incidence of dementia in the affective, paraphrenic and confusional groups in so far as it could be determined within the limitations of this method and with the frequency with which certain clinical features also bearing on the problem of "overlap" between the different categories were observed or recorded in the senile and arteriosclerotic patients. Our follow-up was almost complete. In no case did we fail to obtain sufficient information to enable us to allocate the patient to one of the three main categories of outcome mentioned above at 6 months and 2 years after admission. Only in four discharged patients, two each in 1948 and 1949, was it felt that some uncertainty was attached to the category to which the patient was allocated, owing to the indirect source of our information and/or the fact that some time had elapsed since the last contact between the patient and our informant. For the sake of simplicity in presentation these four patients have been included with the "discharged".

The results for patients admitted in 1948 are now based on more detailed information than that available at the time of our previous report. For this reason, and so as to permit comparison with the pattern of outcome of cases admitted in the 3 other years studied, some of the data relating to the patients admitted since 1948 have been included in this report. For the 1934 and 1936 material information about the "discharged" patients was less complete than that available for 1948 and 1949 cases in whom follow-up study was possible. Therefore in the investigation of pattern of outcome at two years after admission only the 1948 and 1949 material was used. However, insofar as outcome at 6 months after entering hospital was concerned, it was felt that "discharged" described with reasonable accuracy the status of those 1934 and 1936 cases who had left hospital earlier, particularly as additional information was available in some cases about the intervening gap from histories taken at subsequent admissions or relatives' letters. The possible error due to death or entry elsewhere in this intervening period of any of the seven 1934 and 1936 patients in different groups in whom information was inadequate was probably insignificant; it was certainly very unlikely to have contributed appreciably to the pattern of outcome of the five diagnostic categories recorded for these years.

Since in allocating patients to one of the five diagnostic groups we may have been unwittingly influenced to some extent by information presented in the case records about their fate, it was essential to ascertain to what extent the results were likely to have been affected by this source of bias. We, therefore, began in 1951 an investigation in which all patients 60 years or over were examined shortly after admission and classified into one of the five categories described above. Preliminary results available from this investigation and the pattern outcome of these cases 6 months after admission has been compared with the results obtained from the investigation of case records as a check on the validity of the findings derived from the latter.

Each patient is included only once in the investigation, the outcome at the end of 6 months from the date of first admission being recorded. Subsequent admissions in the same year or other years covered by the investigation were omitted from consideration.

RESULTS

1. COMPOSITION OF THE MATERIAL

Only 14 of the 464 cases studied fell into the miscellaneous group of "other disorders". They were contributed by psychoneurosis, G.P.I., cerebral tumour,

Parkinsonism with personality change, alcoholic dementia, Simmonds' disease, chronic heart failure with dementia, uraemic coma, epileptic dementia and psychosis in a mental defective. There is no valid reason for considering the natural history of these varied conditions as a whole and little could be learned from study of the individual cases in isolation. This group will therefore be omitted from further consideration in this paper.

It was possible to place the majority of the remaining 450 cases into one of the five main diagnostic groups with little difficulty. The only problems in classification arose in relation to those patients whose illness combined features of two or more of the groups. Such intermediate cases represented a small proportion of the total material. More detailed reference is made to them below.

The composition of the case material is shown by age and sex in Table I.

TABLE I

		TABLE I																		
		Affective Psychosis			Senile Psychosis			Paraphrenia			Acute Confusion			Arterio-sclerotic Psychosis			Total Group			
		M.	F.	T.	M.	F.	T.	M.	F.	T.	M.	F.	T.	M.	F.	T.	M.	F.	T.	
60-69 years	1934	..	8	12	20	3	1	4	3	3	6	0	2	2	0	1	1	14	19	33
	1936	..	5	12	17	1	3	4	2	4	6	1	1	2	0	0	0	9	20	29
	1948	..	18	37	55	0	2	2	0	5	5	1	8	9	3	1	4	22	53	75
	1949	..	21	47	68	6	4	10	1	11	12	3	2	5	5	4	9	36	68	104
	Total 4 years		52	108	160	10	10	20	6	23	29	5	13	18	8	6	14	81	160	241
70-79 years	1934	..	6	4	10	6	3	9	1	2	3	2	2	4	2	3	5	17	14	31
	1936	..	2	5	7	4	7	11	2	0	2	3	1	4	2	1	3	13	14	27
	1948	..	10	14	24	7	18	25	2	5	7	3	1	4	1	1	2	23	39	62
	1949	..	7	10	17	7	12	19	1	4	5	1	2	3	3	1	4	19	29	48
	Total 4 years		25	33	58	24	40	64	6	11	17	9	6	15	8	6	14	72	96	168
80 years and above	1934	..	0	0	0	1	2	3	0	0	0	0	0	0	2	0	2	3	2	5
	1936	..	0	0	0	1	2	3	0	0	0	0	0	0	0	0	0	1	2	3
	1948	..	2	0	2	1	8	9	0	0	0	1	0	1	0	1	1	4	9	13
	1949	..	0	0	0	4	7	11	0	0	0	2	2	4	4	1	5	10	10	20
	Total 4 years		2	0	2	7	19	26	0	0	0	3	2	5	6	2	8	18	23	41
Total 4 years —All ages			79	141	220	41	69	110	12	34	46	17	21	38	22	14	36	171	279	450

It will be seen that affective psychosis, by itself, accounts for almost half the total number of cases; and if 1948 and 1949 alone are reckoned, the proportion is more than half. Sixty-six per cent. of the cases were first admissions (to mental hospital) and in 55 per cent. the first attack of illness had occurred after the age of 60. In the 70-79 age group senile psychosis becomes the largest single disease, but affective psychosis is not far behind, and in 1948 and 1949 the numbers in this age group are almost equal in the two diseases. It is only in the 80 and over group that senile psychosis has clear numerical preponderance over all other diseases.*

Most of the cases in the affective group suffered from illnesses in which a sustained depression of affect with corresponding changes in ideation and activity were the predominant features. But there were also 14 cases of mania in the 4 years' material representing 0.6 per cent. of the total cases of affective disorder, a surprisingly low proportion.

It will be seen also that there are two disorders, late paraphrenia and acute confusion, both occurring more often than arteriosclerotic psychosis, the only disease other than senile psychosis mentioned by the older texts in relation to old age.

* If the material is divided into five year age groups senile psychosis is consistently preponderant above the age of 75. Four of the cases included with senile psychosis in the 60-69 age group were probably examples of Alzheimer's disease and one of Pick's disease. The relative incidence of presenile dementia will be more reliably obtained from an investigation of patients examined shortly after admission.

Women are in the majority among admissions of every disease with the exception of arteriosclerotic psychosis in which men preponderate. In sex distribution the five diseases are not a random sample of the total population of patients ($P = < 0.02$) the groups largely responsible being arteriosclerotic psychosis and late paraphrenia. Men are in excess in the first and women in the last of these. A comparison has been made with the sex distribution in the corresponding age groups of the population of West Sussex: the 1931 and 1951 Census figures were used for the 1934 and 1936 and the other two years' material respectively. In the case of the small number of patients admitted in 1934 and 1936, neither the material as a whole nor any individual disease differed significantly from the ordinary population. But in 1948 and 1949 though the patients as a whole did not differ in sex distribution there was an excess of men among the arteriosclerotics ($P = < 0.01$) and of women among the paraphrenics ($P = < 0.01$) as compared with the population of West Sussex. Our more recent studies tend to confirm that late paraphrenia is predominantly a disease of old women but the situation is less clear in relation to arteriosclerotic psychoses.

Table I also suggests differences in age distribution, and an analysis of variance reveals that the five groups differ significantly in this respect from the population as a whole ($P = < 0.01$).

2. THE PATTERN OF OUTCOME IN THE FIVE GROUPS

The main question to be considered is whether the classification of the cases into five separate diagnostic groups is valid. An examination of Table II will

TABLE II
Status of 450 Patients Aged 60 Years and Over at 6 Months after Admission

Age Group	Year	Affective Psychosis				Senile Psychosis				Paraphrenia				Acute Confusion				Arteriosclerotic Psychosis			
		Discharged	In-Patient	Dead	Total	Discharged	In-Patient	Dead	Total	Discharged	In-Patient	Dead	Total	Discharged	In-Patient	Dead	Total	Discharged	In-Patient	Dead	Total
60-69	1934	4	14	2	20	—	2	2	4	1	5	—	6	1	—	1	2	—	1	—	1
	1936	6	7	4	17	—	2	2	4	1	5	—	6	2	—	2	2	—	—	—	—
	1948	31	21	3	55	1	1	—	2	2	3	—	5	4	1	4	9	2	1	1	4
	1949	42	19	7	68	2	4	4	10	3	9	—	12	1	1	3	5	2	4	3	9
	Totals	83	61	16	160	3	9	8	20	7	22	—	29	8	2	6	18	4	6	4	14
70-79	1934	4	3	2	9	—	2	7	9	—	3	—	3	1	—	3	4	1	3	1	5
	1936	3	4	—	7	1	6	4	11	—	2	—	2	3	—	1	4	1	2	—	3
	1948	13	9	2	24	1	9	15	25	—	6	1	7	1	2	1	4	—	1	1	2
	1949	9	5	3	17	3	6	10	19	1	3	1	5	3	—	—	3	—	2	2	4
	Totals	29	21	7	57	5	23	36	64	1	14	2	17	8	2	5	15	2	8	4	14
80 years and over	1934	1	—	—	1	—	—	3	3	—	—	—	—	—	—	—	—	—	1	1	2
	1936	—	—	—	—	—	—	3	3	—	—	—	—	—	—	—	—	—	—	—	—
	1948	1	1	—	2	3	1	5	9	—	—	—	—	1	—	—	1	—	—	1	1
	1949	—	—	—	—	1	—	10	11	—	—	—	—	2	—	2	4	2	1	2	5
	Totals	2	1	—	3	4	1	21	26	—	—	—	—	3	—	2	5	2	2	4	8
Totals of all Age-Groups Combined		114	83	23	220	12	33	65	110	8	36	2	46	19	4	15	38	8	16	12	36

show that each of the diseases has a distinctive pattern of outcome. This can be seen at a glance in Fig. 1. Here the percentages derived from the totals for each disease in Tables II and III have been converted into histograms, in which the proportion of discharged, in-patient, and dead has been represented in separate columns for each disease, and for the population as a whole. Cases of affective

psychosis admitted in the first two years covered by the survey have been represented separately from those for 1948 and 1949, since patients in these latter years had often received convulsive treatment, which was not in use in 1934 and 1936. In the case of the other diseases the treatment given has not altered since 1934, and the four years' material has therefore been grouped together. Omitting cases of affective disorder admitted in 1934 and 1936 from consideration for the present, it will be seen that each of the five diseases has one or more distinctive peaks. Thus, the peak (58 per cent.) for affective psychosis is

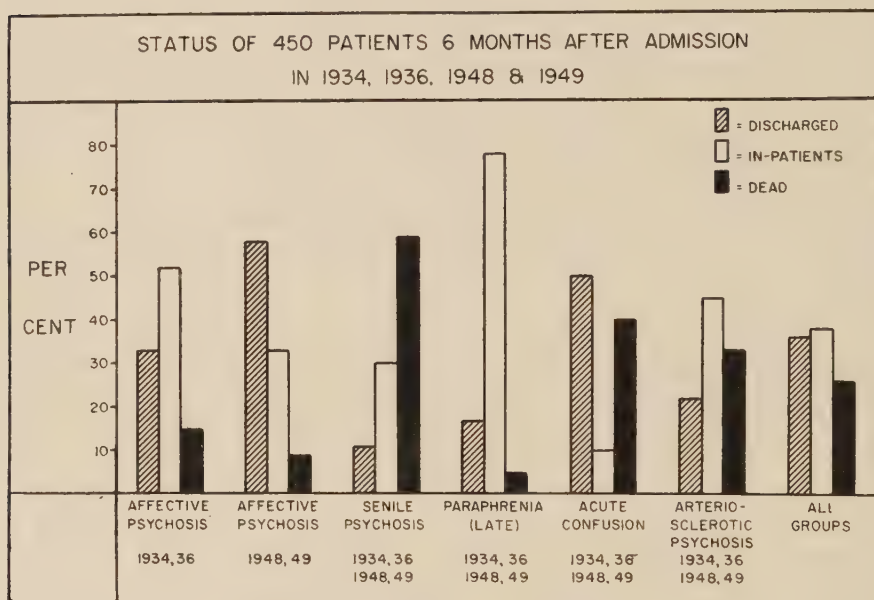


FIG. 1.

in the "discharged" column, for senile psychosis in the "dead" column (58 per cent.), for late paraphrenia among the "in-patients" (76 per cent.). For acute confusion there are two peaks, differing by only 10 per cent. in the "discharged" and "dead" columns (50 per cent. and 40 per cent. respectively), while arterio-sclerotic psychosis shows a more even spread among the different categories of outcome, though the two highest columns are those for the in-patients (44 per cent.) and the dead (34 per cent.). The pattern of outcome of the five groups is distinct from that of the total population of patients ($P = < 0.01$).

Further inspection of Table II shows, moreover, that the pattern for each disease tends to retain its specificity from year to year and also within each age group. In spite of the small numbers involved in some groups the consistency in pattern is striking. In the affective group the numbers were adequate for this consistency of pattern of outcome with age to be tested statistically. There is in fact no significant difference in outcome between patients aged 60 to 69 years and those 70 and over ($P = > 0.80$).

There is, however, an obvious difference between admitted cases' patterns during the "pre-E.C.T." years 1934 and 1936 and those in 1948 and 1949 in which E.C.T. was extensively used. Inspection of Table II and Fig. 1 shows that there has been a significant shift since the earlier years from the "in-patient" to the "discharged" column ($P = 0.01$).

At two years after admission Fig. 2 shows that each disease has largely retained its distinctive pattern of outcome with the exception of arteriosclerotic psychosis. The peak in this disease has shifted to the "dead" column and reaches 73 per cent., making the prognosis little better than that of senile psychosis, in which deaths have climbed to 82 per cent. Mortality has slightly altered the pattern in the case of paraphrenia but the peak remains in the "in-patient" column. In acute confusion the patients are now evenly divided between the

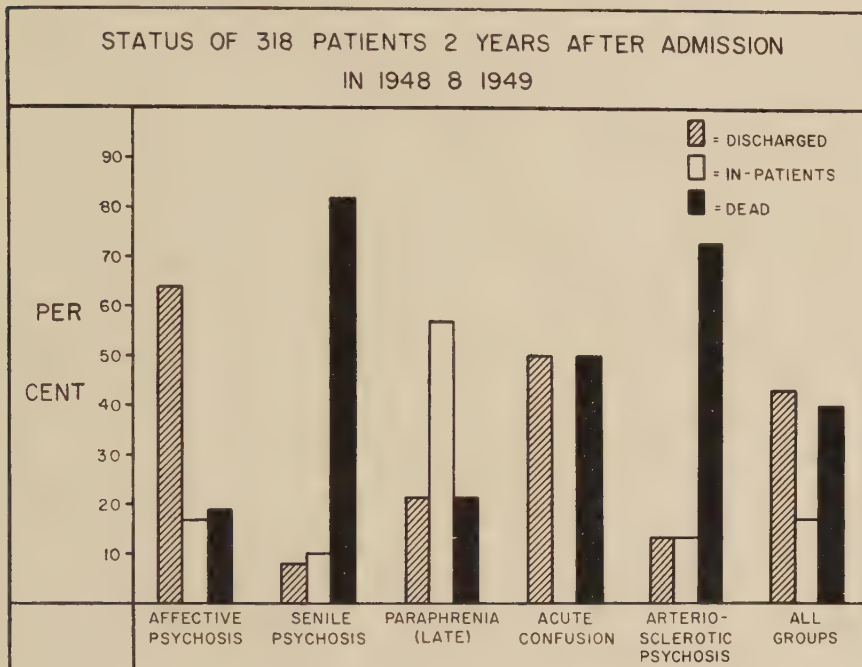


FIG. 2.

"dead" and the "discharged". In the case of affective disorder analysis of the figures shows that some 44 per cent. of the patients in hospital at six months after admission have been discharged and a small proportion of discharges (6 per cent.) readmitted; but there have been very few such changes in status in the other groups though some rise in mortality has of course occurred in all.

An examination of Table III where the pattern of outcome is represented according to age and sex reveals some interesting differences between the sexes. This is most clearly shown in senile psychosis where the mortality is consistently lower among the women and the proportion of in-patients higher. This difference in outcome between the sexes is statistically significant ($P=0.01$) and was found also to hold for all ages combined in the total material ($P<0.01$). A similar though less clear trend is to be observed in the total figures for each diagnostic group with the exception of acute confusion. However, in the case of affective disorder the difference is not statistically significant and the numbers in the other groups are too small for statistical treatment. The higher mortality of human males, particularly in the later stages of life, is a biological phenomenon that is ill-understood. There is no clear explanation for the difference among the senile psychotics but it is of interest that it should be so unequivocal in a group that is often regarded as a caricature of the process of normal

TABLE III

	AFFECTIVE PSYCHOSIS				SENILE PSYCHOSIS				PARAPHRENIA				ACUTE CONFUSION				ARTERIOSCLEROTIC PSYCHOSIS													
	DIS.		IN-P-DEAD.		TOTAL		DIS.		IN-P-DEAD.		TOTAL		DIS.		IN-P-DEAD.		TOTAL		DIS.		IN-P-DEAD.		TOTAL							
AGE 60-69 YEARS	M28	17	7	M	52	M	1	2	7	M	10	M	1	5	-	M	6	M	2	1	1	M	5	M	2	2	4	M	8	
	F55	44	9	F	108	F	2	7	1	F	10	F	6	17	-	F	23	F	6	1	7	F	13	F	2	4	-	F	6	
	83	61	16		160	3	9	8		20	7	22	-			29	8	2	8		18	4	6	4				14		
AGE 70-79 YEARS	M14	8	6	M	28	M	4	3	17	M	24	M	1	4	1	M	6	M	5	1	3	M	9	M	2	4	2	M	8	
	F15	13	1	F	29	F	1	20	19	F	40	F	-	10	1	F	11	F	3	1	2	F	6	F	-	4	2	F	6	
	29	21	7		57	5	23	36		64	1	14	2			17	8	2	5		15	2	8	4				14		
AGE 80 & OVER	M	1	-	M	2	M	1	-	6	M	7	M	-	-	-	M	-	M	2	-	1	M	3	M	1	2	3	M	6	
	F	1	-	-	F	1	F	3	1	15	F	19	F	-	-	-	F	-	F	1	-	1	F	2	F	1	-	1	F	2
	2	1	-		3	4	1	21	26	-		-	-	-	-	-	3	-	2		5	2	2	4				8		
TOTALS OF ALL AGE GROUPS COMBINED	M43	26	13	M	82	M	6	5	30	M	41	M	2	9	1	M	12	M	9	2	5	M	17	M	5	8	9	M	22	
	F71	57	10	F	138	F	6	28	35	F	69	F	6	27	1	F	34	F	10	2	10	F	21	F	3	8	3	F	14	
	114	83	23		220	12	33	65		110	8	36	2			46	19	4	15		38	8	16	12				36		

OUTCOME OF 450 PATIENTS AT 6 MONTHS AFTER ADMISSION BY AGE & SEX FOR YEARS 1934, 36, 48, 49

senescence. The phenomenon warrants further investigation, particularly as a high proportion of these patients come to autopsy.

Although the numbers are small it will be clear from Table IV that with minor discrepancies the pattern of outcome tends to be consistent in the two years' material studied and in the different age groups. Some sex differences in pattern of outcome (not shown) are again present in the material as a whole

TABLE IV
Status of 318 Cases Admitted in 1948 and 1949 Two Years After Admission

Age Group	Year	Affective Psychosis				Senile Psychosis				Paraphrenia				Acute Confusion				Arteriosclerotic Psychosis			
		Discharged	In-Patient	Dead	Total	Discharged	In-Patient	Dead	Total	Discharged	In-Patient	Dead	Total	Discharged	In-Patient	Dead	Total	Discharged	In-Patient	Dead	Total
60-69	1948	38	12	5	55	1	1	—	2	2	3	—	5	3	1	5	9	—	3	1	4
	1949	51	8	9	68	2	2	6	10	4	7	1	12	3	1	4	8	1	—	6	7
Totals	..	89	20	14	123	3	3	6	12	6	10	1	17	4	1	9	14	1	3	7	11
70-79	1948	12	4	8	24	1	3	21	25	—	4	3	7	2	—	2	4	1	—	1	2
	1949	6	4	7	17	—	2	17	19	1	1	2	4	3	—	—	3	—	—	4	4
Totals	..	18	8	15	41	1	5	38	44	1	5	5	11	5	—	2	7	1	—	5	6
80 years and over	1948	—	—	2	2	1	—	8	9	—	—	—	—	1	—	1	—	—	—	1	1
	1949	—	—	—	—	1	—	10	11	—	—	—	—	2	—	2	4	1	—	3	4
Totals	..	—	—	2	2	2	—	18	20	—	—	—	—	3	—	2	5	1	—	4	5
Totals of all Age-Groups Combined	..	107	28	31	166	6	8	62	76	7	15	6	28	12	1	13	26	3	3	16	22

although these are less pronounced than at 6 months. Fewer women are dead and more are "in-patients" and discharged, the figures being 45 per cent. discharged, 20 per cent. in-patients and 35 per cent. dead among the women as against 42 per cent. discharged, 9 per cent. in-patients, and 49 per cent. dead among the men; the difference is statistically significant ($P = < 0.01$). A trend towards greater mortality among males is also seen in the affective senile and arteriosclerotic groups.

The fate of the manics deserves special mention, since it was rather worse than that of the remainder of the affective group. Reference to Table V shows that these patients are discharged from hospital less often than those with

TABLE V
Outcome in 28 Cases of Mania

	Discharge				In-Patient				Dead			
Outcome at 6 months	..	..	..	..	3	9	2					
Outcome at 2 years	..	..	..	..	5	6	3					
Totals	..	..	..	..	8	15	5					

predominantly depressive symptoms. Both at 6 months and 2 years after admission the majority of patients are either in hospital or have died. All manic cases in the material have been included, and the 2 year outcome may therefore exaggerate the proportion of discharges since in 2 of the cases admitted in 1936 there was no information about progress after discharge in the records and they

were presumed to be alive and out of hospital. The numbers are small, but our recent studies of patients admitted in 1951 and 1952 confirm this suggestion of a relatively poor prognosis for mania as compared with depression in old age. Nevertheless, the pattern of outcome is still distinct from that of the organic groups.

In Table VI the pattern of outcome in patients investigated and diagnosed shortly after admission in 1951-52 is contrasted with that of patients classified on the basis of information in the case records. The correspondence between the

TABLE VI

				Year	Discharge	In-Patient	Dead	Total
Affective	..	..	..	48+49	97	54	15	166
Psychosis	..	..	..	51-52	63	14	8	85
Senile	..	..	..	34+36 48+49	12	34	64	110
Psychosis	..	..	..	51-52	1	12	15	28
Late	..	..	..	34+36 48+49	9	34	2	45
Paraphrenia	..	..	..	51-52	3	11	1	15
Acute	..	..	..	34+36 48+49	18	4	16	38
Confusion	..	..	..	51-52	8	2	7	17
Arteriosclerotic	..	..	..	34+36 48+49	7	15	11	33
Psychosis	..	..	..	51-52	7	8	7	22

two sets of results is so close that the results may be regarded as largely independent of the possible source of bias discussed above. The results described so far suggest that the five conditions are by and large distinct entities. But more stringent tests need to be applied to test the validity of the hypotheses outlined above which led to the distinctions drawn between specific groups of these diseases.

3. DIFFERENCES BETWEEN SPECIFIC GROUPS

(a) *Affective psychosis and the organic psychoses*

The difference in pattern of outcome at six months after admission between the affective and senile psychoses (1948, 1949) was highly significant ($P = < 0.01$) and largely independent of differences in age distribution between the two groups; for in the 70-79 age group the difference remains significant below the 1 per cent. level. Convulsive treatment has increased the proportion of discharges of affective psychotics, but is not the cause of this difference, which is still unequivocal in the 1934 and 1936 cases ($P = < 0.01$).

There were too few arteriosclerotics for a separate statistical examination of their differences from affectives, but inspection of Tables II and III shows them to be clear and consistent. Moreover, when cases aged 70-79 years alone are considered, so as to minimize the influence of age, and the senile and arteriosclerotic groups are combined, there is still a significant difference in outcome from affective psychosis ($P = < 0.01$). Two years after admission these differences between the senile and affective and the senile-arteriosclerotic and affective

groups continue to be present ($P = < 0.01$ in each case) and are again not accountable in terms of age differences. There is now also a significant difference in mortality between affective and arteriosclerotic psychosis*. Affective disorder would thus appear to be distinct in natural history from the main causes of progressive dementia in old age.

(b) *Late paraphrenia and the organic group*

Before considering the evidence for the independence of paraphrenia it should be stated that the majority of these patients (75 per cent.) had first fallen ill after the age of 60 and with one exception the illnesses had in all cases commenced after 45. In studying the difference between paraphrenia and senile psychosis cases aged 80 and over were omitted from consideration since there were no paraphrenics in this age group, but a substantial number of senile psychotics. At six months, paraphrenia differs significantly in outcome from senile psychosis ($P = < 0.01$) and in mortality from arteriosclerotic psychosis ($P = < 0.01$). At two years after admission in the 1948 and 1949 cases, differences in mortality from the senile and arteriosclerotic psychoses were each significant at the 1 per cent. level. Inspection shows the trends to be in the same direction within each age group, and for each year under discussion. It is evident that late paraphrenia is distinct from the senile and arteriosclerotic psychoses.

(c) *Acute confusion and senile and arteriosclerotic psychoses*

The difference in outcome evident on inspection between acute confusion and senile psychosis was statistically significant as was that between the confusional and arteriosclerotic groups ($P = < 0.01$ in each case); the groups were compared as a whole, the numbers being insufficient for a study of separate age groups. At two years after admission the senile psychotics seem to do consistently worse than the confusions, but as numbers were inadequate for a comparison based on three categories of outcome, the mortalities were compared; the confusions were found to enjoy a significant advantage ($P = < 0.01$). Inspection of Table IV shows that the arteriosclerotics are also more prone to die and less likely to be discharged than the confusions, but only mortalities could be compared and the difference was not statistically significant. However, despite the small numbers, the differences in pattern of outcome as shown in Table IV are consistent and they might on examination of a larger material prove to be real.

(d) *Senile psychosis and arteriosclerotic psychosis*

The fact that these diseases show a significant difference in sex distribution, although sex was not a criterion in classification, can be taken as one source of evidence that by and large they are distinct entities. There is a significant difference in pattern of outcome at six months between senile and arteriosclerotic psychosis ($P = < 0.05$). This is not due to a difference in age or sex distribution; when the mortalities for the 60-79 groups are compared, the arteriosclerotics still show a significant advantage. A comparison of the mortality of males of all ages in the two diseases shows significantly more arteriosclerotics alive at six months ($P = < 0.05$). Inspection of Table III shows that the differences are consistently present within each age group. At two years after admission the numbers lent themselves to a comparison of mortalities only and the difference between senile and arteriosclerotic psychosis was not significant. While the differentiation of the two diseases is valuable for a relatively short

* Discharged and in-patients were grouped together for this purpose, numbers being inadequate for treatment in three categories of outcome.

term prognosis, there is, therefore, little, if any, difference in outcome after two or more years. However, it would seem probable, taking all the data into consideration, that the conditions are by and large distinct disorders. The question as to whether the two main criteria used for identifying arteriosclerotic psychosis define cases with an identical or different natural history remains to be investigated in a larger material.

4. THE OVERLAP BETWEEN THE DISORDERS

We shall mainly concern ourselves here with the degree of overlap between affective psychosis on the one hand and senile and arteriosclerotic psychosis, since it is this problem that has the greatest bearing upon the prognosis and treatment of mental disorder in old age. Needless to say, a study such as the present one can provide only a rough approximation of the proportion of cases in which features of two or more syndromes are combined. An accurate assessment of the degree of overlap must await investigation of a large group of patients recently and consecutively admitted to hospital. With these reservations in mind, it is legitimate to try and obtain some tentative indication from this additional source of evidence as to the degree of association between the different disorders. This was studied by (a) making a note of all cases in which an affective or paraphrenic syndrome was associated with the picture of senile or arteriosclerotic psychosis; (b) by investigating those patients in the material who were in hospital at the time the follow-up investigation was carried out; (c) by recording any changes in the clinical picture in patients followed up in their homes; (d) by studying the history of the early stages of senile and arteriosclerotic psychosis in the case records. The follow-up study was confined to patients admitted in 1948 and 1949. Our most recent information about these patients was obtained three to four and a half years after admission to hospital. Four cases were regarded as showing some dementia on follow-up or having probably been demented for a period before their death. In two other cases dementia was clearly unconnected with the affective disorder; in one the intellectual decline had commenced immediately after an attempt at suicide by coal gas poisoning and in the other a rapidly progressive dementing process proved on post mortem to have been due to widespread multiple cerebral metastases.

In investigating the incidence of affective symptoms in the senile and arteriosclerotic psychoses all cases in the four years material were considered; we obtained no evidence to suggest that follow-up study increased the number of such cases identified. There were three cases of arteriosclerotic and one of senile psychosis which had shown at some stage of the illness a *sustained depressive symptom complex* that might have led to a diagnosis of affective disorder if the mental and physical symptoms of cerebral disease had been overlooked. In one of these cases the illness seems to have begun with affective symptoms alone; in the three others organic features had been present, as far as could be determined from the beginning.

There is, however, another type of affective change associated with the organic psychoses of old age, and with arteriosclerotic psychosis in particular. The mood change is short-lived and shallow, and emotional incontinence may give it a characteristic quality. Depressive ideas are fragmentary and transient and the whole picture usually has a characteristic lability. This kind of affective disturbance had been present since the outset of the illness in 8 cases of arteriosclerotic psychosis. At an earlier stage of one of the cases of senile psychosis a similar picture had been recorded. The lability of the depressive symptoms was

particularly well shown in two of the cases of arteriosclerotic psychosis who had made weak, obvious and ineffectual attempts at suicide before admission; a few hours later when they arrived at hospital they were euphorically oblivious of what had happened. This group of cases seems, therefore, to deserve separate consideration from conditions in which a *sustained depressive symptom-complex* is associated with arteriosclerotic or senile disease.

Thus the incidence of dementia after some 3-4½ years' observation in cases presenting a typical psychosis is 2·4 per cent. Of the total number of senile and arteriosclerotic psychoses 2·7 per cent. showed a typical affective symptom-complex. A little over 6 per cent. showed some degree of affective colouring of a less specific kind. If all cases with affective symptoms are reckoned together, we obtain a total of about 9 per cent. for the senile and arteriosclerotic group. The complication appears to be rare in senile psychosis, being more characteristic of arteriosclerotic psychosis; 30 per cent. of the cases with this condition show some affective colouring, about a quarter of these having symptoms similar to those of an affective psychosis. We shall have more to say about the significance of these figures at a later stage.

Our follow-up studies showed that in one case of late paraphrenia a dementia had begun and was progressing at a slow rate. We were unable to find among the histories of cases with organic psychosis any patient whose illness had commenced with a well-integrated system of paranoid delusions, such as seen in late paraphrenia, with the dementia supervening at a later stage. Nor were there any cases in which the presenting picture combined the features of late paraphrenia with either senile or arteriosclerotic psychosis.

Some degree of disorientation or clouding of consciousness was seen in 12 per cent. of cases of affective psychosis in the acute stage. As far as we have been able to determine, these symptoms subsided in all cases with the improvement in the affective features of the illness. However, a relapse of the affective psychosis was frequently associated with a temporary return of some degree of confusion or disorientation.

The clinical distinction between affective psychosis and paraphrenia was relatively sharp. A feature of affective psychosis common to all ages is the presence of paranoid ideas that are largely accountable as projections of the patients' feelings of guilt and unworthiness. All such cases with paranoid ideas occurring in the setting of a disturbed affect were classified with affective psychosis. It is well known that in a small proportion of such cases the paranoid features become increasingly pronounced and elaborate and the psychosis grows more and more resistant to treatment. This change had occurred in a few cases without, however, obscuring the nature of the illness. From marked differences in course and outcome as well as clinical picture, it will be evident that the two disorders are largely independent. But the relationship is not a problem peculiar to old age mental disorder and was not the subject of one of our hypotheses; it will not therefore be given further consideration here.

DISCUSSION

1. *The General Significance of the Findings*

The results provide confirmation for the hypotheses on which the investigation was based. They suggest that affective psychosis, late paraphrenia and acute confusion are distinct from the two main causes of progressive dementia in old age; senile and arteriosclerotic psychosis. They also provide some support for the validity of the clinical distinction drawn between senile and arteriosclerotic psychosis. The fact that the system of classification applied here,

initially to case records and subsequently to patients on admission, was consistently confirmed by means of simple, objective criteria relating to outcome such as discharge from hospital, in-patient status and death, emphasizes its effectiveness. It would appear that there are five main specific clinical entities accounting for most cases of mental disorder in old age admitted to this hospital, and that these may be distinguished from each other with relative ease.

The category of disease has a far-reaching influence upon the prognosis of the individual case. Thus, if prediction in the individual patient were based on the diagnostic category alone and features peculiar to his case ignored, it would correctly forecast discharge in more than half the cases of acute confusion, in-patient status of more than 7 out of 10 cases of paraphrenia, and death of 6 out of 10 cases of senile psychosis six months after admission to hospital. In affective psychosis, discharge would be correctly predicted more than 6 out of 10 times. Predictions two years after admission would be no less correct in the case of affective psychosis and acute confusion, and considerably more so in the case of the senile and arteriosclerotic psychoses. It will be clear that a classification attributing universal aetiological significance to senile and arteriosclerotic processes would lead to considerably less accurate predictions.

It is not infrequently assumed that the prognosis of an illness in psychiatry is rarely, if ever, given to any significant degree by the category of disease into which it falls. It has, rather, to be determined from a comprehensive assessment of the patient's grading on a large number of scales of reference, among these being those relating to emotional disturbance in childhood, sexual adjustment, stability of premorbid personality, and degree of social integration as well as any organic factors likely to be relevant. Quite apart from the error inherent in grading along a given dimension, the danger this kind of assessment presents when it ignores diagnostic categories is that judgment of the relative importance of the different dimensions tends in an individual case to become a matter of subjective and arbitrary choice. Importance may thus come to be attached to factors whose association with the illness is remote and which deserve no more than an insignificant place in the hierarchy of causes.

If the findings reported here are correct, it will be evident that diagnosis of the category of illness is an essential prerequisite towards accurate prognosis of mental illness in old age. It will be equally clear, however, that with the aid of the patterns defined here for each disease process, it should be possible, particularly in the case of affective psychosis, to improve upon the prediction of probable outcome based on diagnosis alone, by taking into consideration such factors as previous personality, physical health before the psychotic breakdown, frequency of relapse, and the possibilities that exist for rehabilitation into the community.

A point of some general importance arising from this discussion is that greater precision in predicting the course of disease is among the advantages resulting from progress in relation to problems of classification.

A finding of considerable practical importance is confirmation for the numerical preponderance of affective psychoses among the old age mental disorders which was recorded in our previous investigation. This raises the question as to how far the pattern of our findings is likely to be representative for this country as a whole. It is of considerable importance to try and obtain evidence in this connection, since mental illness in old age is often discussed as if it were wholly a problem of the senile and arteriosclerotic psychoses. No precise judgment can be formed from the available data. But there is available

for purposes of comparison the report by Cook, Dax and Maclay (1952) on the fate of patients aged 65 and over admitted to seven mental hospitals in different areas. A comparison with those of our cases admitted during the year 1948-1949, aged 65 and over, shows that six months after admission there is no significant difference in pattern of outcome for the total material ($P=0.20$). When the patients are divided up according to sex, the males at Graylingwell show a significant advantage in outcome ($P=0.02$) with a higher proportion of discharges and fewer in-patients. The female patients did not differ significantly in outcome in the two samples. A comparison of mortality reveals no significant difference either for the total material ($P=0.80$) for males ($P=0.80$) or females ($P=0.95$) considered separately. Moreover, the pattern of outcome at two years does not differ significantly in regard to discharges, dead or in-patients in the two samples in either sex ($P=0.30$ in each case). Since senile psychotics (who form by far the largest single organic group) consistently show a mortality of about 60 per cent. six months after admission and over three-quarters of the senile and arteriosclerotic cases as a whole are dead after two years as compared with mortalities of 29 per cent. and 40 per cent. respectively in the total material studied by Cook *et al.*, it would seem probable that disorders with a far better prognosis than these organic syndromes are well represented among cases admitted to mental hospitals in other parts of Great Britain. Affective psychosis is likely to figure prominently among these cases with favourable outcome.

2. *The Problem of Overlap*

If the two year outcome alone is considered, the five diseases may be divided into two main groups, the arteriosclerotic-senile and the affective-late-paraphrenic with very high and very low mortality respectively, and a smaller group with acute confusion which falls somewhere between these two in death rate. There can be little doubt that these two main groups are largely distinct from each other. Not only are they different in clinical picture and pattern of outcome but very few affective or paraphrenic patients become demented and the great majority of senile and arteriosclerotic psychotics show features of an organic psychosis from the beginning of their illness. A fairly sharp distinction may therefore be drawn between psychoses commencing with affective symptoms and those with organic features from the beginning. The question that arises is whether the proportion of affectives who become demented and the proportion of organic cases who manifest functional psychotic symptoms is of such an order that it is necessary to postulate some special aetiological relationship between the two unequivocally organic and the two other groups, or whether it can be accounted for in terms of a fortuitous coincidence between independent disease processes.

The problem is raised most sharply by the overlap between the affective and organic psychoses; the combination of late paraphrenia and organic dementia seems very rare. As for clouding of consciousness, since this is generally recognized as a universal pattern of response to toxic infective and acute psychotic processes the 12 per cent. of affective cases with confusion raise no general problems at the present stage. On the other hand the balance of the evidence suggests that the predisposition to affective psychosis is a specific and not a universal one. In the case of manic depressive psychosis this would appear to derive from a Mendelian dominant with a manifestation rate of 1 in 3 or 4 (Slater, 1936; Stenstedt, 1952). There is less certainty about the mode of inheritance in the case of involutional and old age affective disorders but the balance of the evidence suggests that the predisposition is also a specific

one. Our own preliminary studies among admissions over the age of 60 have shown that those who have suffered depressive or manic attacks before this age do not differ significantly in respect of specific hereditary loading from those whose first illness occurs after 60 (Kay and Roth, 1955). Now, if typical depressive and manic pictures were far more common in the senile and arteriosclerotic psychoses than could be reasonably explained by chance association, we should either have to assume some aetiological relationship between affective disorder and these organic degenerations or some doubt would be cast upon the specificity of the predisposition to depressive and manic psychoses.

The problem exists in identical form in relation to other organic psychoses such as those associated with cerebral tumour and head injury. Here the data would appear to give clear answers to the questions posed above. In an unusually large series studied in a neurosurgical hospital Walther found 5 per cent. of cases with depressive schizophrenic and neurotic symptoms. In the majority of these cases there was a family history of similar mental illness in the absence of cerebral tumour. The facts are here in accord with a fortuitous coincidence of independent disease processes, the functional disorders being derived from a pre-existing vulnerability that is merely "uncovered" by the cerebral disease. Similarly, in the case of penetrating head injury, the indications are that where a typical depressive psychosis ensues this is probably associated with a pre-existing predisposition to affective disorder (Tennent, 1939), nor is there evidence that schizophrenia is ever caused rather than precipitated by head injury (Feuchtwanger and Mayer-Gross, 1938). The figures of 7 per cent., 3 per cent. and 0.5 per cent. from Bostroem's clinic (1930) giving the incidence of cases of G.P.I. with depressive, schizophrenic and manic symptoms respectively, still indicate a relatively small overlap with functional disorders, though greater perhaps than can be accounted for in terms of chance association alone, if we assume expectations in the region of 0.8 per cent. for manic depressive psychosis and 1 per cent. for schizophrenia—the figures reported for Sweden by Sjögren (1948). But in a disease like G.P.I. the psychiatrist tends to see a biased material in which those with positive psychotic features may well be over-represented. Moreover, in so far as any excess of affective cases is concerned, a manifestation rate of 1 in 3 or 4 (vide supra) described for manic-depressive psychosis might well be considerably increased by cerebral disease; if this argument is valid a 3–4 fold increase on normal expectation might yet be compatible with independence to a very large extent of the cerebral disease concerned, and the affective psychotic features with which it is associated.

Turning to our own data, the incidence of 2.4 per cent. dementia in the affective group may be compared with the figure of 1 per cent. reported by Lundquist in 185 manic-depressives. In view of the greater risk of dementia in individuals all over 60 it would seem doubtful whether this figure requires that any special relationship between affective psychosis in old age and dementia be invoked.

What interpretation is placed upon the incidence of affective symptoms in the senile and arteriosclerotic cases must depend on whether a distinction is maintained between ill-sustained, atypical depressive symptoms and a depressive symptom-complex. If only the latter are reckoned, and this seems to us a legitimate procedure at the present time, an incidence of 2.7 per cent. for the organic group as a whole and 8 per cent. for the arteriosclerotics alone is obtained. Figures of this order need not indicate any special relationship between affective and organic psychoses in the old, for the following reasons. The morbidity risk of about 1 per cent. for manic depressive psychosis has usually been based

on a period of risk with 50 or 60 years as its upper limit. A rather higher figure could be expected if this upper limit were raised and most cases with predominantly affective symptoms reckoned in estimating incidence; this procedure would appear to be desirable in the light of our findings. If the factors discussed in relation to the excessive representation of affective and other psychotic pictures in G.P.I. were also taken into consideration, the figures quoted could be reasonably accounted for in terms of fortuitous coincidence. Even the greater incidence of affective symptoms in arteriosclerotic than in senile psychosis could perhaps be explained, since the psychiatrist is more likely to see a selected population of those with cerebrovascular diseases.

However, our assumption that cases with transient affective symptoms can be omitted from consideration in this connection can only be tentative, and its validity requires investigation by more detailed clinical studies as well as comparison of the hereditary loading with affective disorder in the two types of arteriosclerotic psychosis with affective features. It has also to be borne in mind that the figures we have obtained from case records must be regarded as minimal. While results from further case record material have largely agreed with those quoted here, our studies of cases on admission would appear to suggest that a somewhat higher incidence of cases of arteriosclerotic psychosis with both sustained and fleeting affective features may be expected. If the distinction between these two types of case is invalid it would seem that more than 30 per cent. of cases of arteriosclerotic psychosis also manifest at some stage in their course symptoms of an affective psychosis. Such an incidence would rather suggest some special relationship between cerebrovascular disease and affective disorder. This could either be that there was some factor common to cerebrovascular disease and the predisposition to affective disease, or that the predisposition to affective psychosis was a universal rather than a specific one (as suggested by much of the existing evidence) and particularly likely to be rendered manifest by cerebrovascular disease.

Pending further investigations no definite conclusion can be reached. It will be evident that the issue cannot be decided on the basis of relatively crude data such as those quoted here; they have been utilized only in an attempt to define the nature of the problem.

To sum up this part of the discussion, it would seem that very few cases of affective psychosis become demented and an insignificant proportion of senile and arteriosclerotic psychosis commence with affective symptoms alone. The incidence of affective symptoms in senile psychosis is low and probably due to chance association. But more than one quarter of cases of arteriosclerotic psychosis have affective symptoms. The precise significance of this finding cannot be decided without further investigation.

3. *Problems for Investigation*

Among problems for further investigation are those related to differences in outcome *within* each of the five groups. What factors, for example, are associated with death on the one hand and discharge from hospital on the other in the acute confusional group? A preliminary analysis suggests that confusion complicating cardiac failure or respiratory infection frequently proves fatal whereas that associated with no specific identifiable cause often subsides. Such suggestions need to be followed up by investigation of a larger material including cases recently admitted to hospital. It may be possible to learn in this way how to tilt the balance in favour of recovery. There are obvious differences in outcome in the other groups inviting further scrutiny.

Other comparisons need to be made. It should be possible, for example, from a comparison of cases of affective psychosis with their first attack after the age of 60 and those with attacks earlier, to learn something about the factors that decide whether breakdown will occur early or late in life; an analysis of similarities and differences between the groups in relation to clinical picture, personality pattern, heredity, outcome and the incidence of social and environmental stresses should have much to tell us about the factors linked with affective disorders in old age, and the relationship the latter bear to manic and depressive illness in earlier life. Within the arteriosclerotic group comparisons might reveal whether or not cases with and without unequivocal cerebral infarction differ in their long term course.

Apart from the problems presented by the differences in outcome within each disease entity, there are the differences in pattern *between* the groups of disorders calling for further investigation.

Comparisons of the psychological performance of the five groups have already provided further confirmation for the validity of the lines of demarcation drawn between the five disorders on the basis of clinical picture and natural history (Roth and Hopkins, 1953; Hopkins and Roth, 1953). Three psychological tests were given to 170 patients who were each classified into one of the five categories described above. Clinical and psychological investigations were carried out independently. Test scores placed the affective group and the paraphrenics on the one hand and the senile psychotics on the other, into two almost wholly distinct distributions with relatively little overlap. Most cases of acute confusion also fell into the distribution occupied by the affective group, while cases of arteriosclerotic psychosis occupied an intermediate position between the distributions of the senile and affective groups, showing some degree of overlap with each.

There are other variables calling for investigation along similar lines. Study of the pathology of the brain in the five groups could be expected to throw some light on difficult problems that have arisen in relation to the neuropathology of old age mental disorder. Since the findings of Gellerstedt (1933) it has become increasingly clear that senile plaques and neurofibrillary changes are not specific for senile psychosis and Alzheimer's disease; they occur in cases of functional psychosis who survive to old age (Newton, 1948) and in normal old people. The aetiological role of such changes might well be clarified by some information as to how these five groups differ in this respect from each other and from individuals dying outside mental hospitals.

Moreover, it should be possible in the light of these findings, to submit observations such as those of Rothschild to further validation. He has found that there is little correlation between the degree of cerebral damage and the severity of the clinical changes in psychoses associated with cerebrovascular disease. With a consistent pattern of outcome defined for this group of disorders it should be possible to compare the severity of the pathological changes in individual cases to their typicality of outcome in relation to that of the diagnostic group as a whole.

There must also be biochemical and physiological differences between the groups, and their investigation might bring to light data of aetiological or practical importance. In this connection special interest attaches to senile psychosis which may be regarded in the light of these findings as a specific disease causing rapid disintegration and death, but somewhat less malignant in its effects on females than males. A specific physical disease process is rarely present to explain the patient's swift decline, nor does autopsy often throw

much further light on it. It is therefore a biological phenomenon of the greatest interest, the investigation of which might throw some light on problems of ageing as well as dementia and the cerebral degenerative processes.

Finally, psychological and environmental factors such as premorbid personality pattern, social integration and retirement are unlikely to be of equal importance in these five groups so markedly different in natural history. Here again comparison of the groups with regard to the incidence of such factors might give some indication of their specific role in old age mental disorder.

The aim of this part of the discussion has been to show that if the results validate the system of classification of old age mental disorder proposed above, then comparisons *between* and *within* the five groups defined might be expected to reveal factors of aetiological significance.

SUMMARY

1. The case records of 450 patients were studied and classified into five previously defined diagnostic groups: Affective Psychosis, Senile Psychosis, Late Paraphrenia, Acute Confusion and Arteriosclerotic Psychosis. Affective Psychosis accounted for over half the cases in the total material. Follow up studies showed that at six months and two years after admission each of the five disorders is characterized by a distinctive pattern of outcome as described by the proportion of patients dead, in hospital and out of hospital.

2. Examination of differences in pattern of outcome between specific groups provides strong confirmation for hypotheses suggesting that affective psychosis, late paraphrenia and acute confusion were each entities largely independent of the two main causes of progressive dementia in old age: senile and arteriosclerotic psychosis. The relevant differences between the groups were largely independent of differences in age distribution.

3. There is some evidence to suggest that the findings may have a bearing upon the problems of old age mental disorder faced by hospitals in other parts of this country.

4. The overlap between the senile-arteriosclerotic group on the one hand and the affective-paraphrenic group on the other was relatively small. But if all kinds of affective disturbance are reckoned, their incidence in arteriosclerotic psychosis is greater than is likely to be accountable in terms of fortuitous coincidence.

5. Problems for further study are discussed. Investigations into the differences *between* and *within* the groups might lead to the identification of factors of practical or aetiological significance.

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REFERENCES

- BLEULER, E., *Lehrbuch der Psychiatrie*, 1916. Berlin: Julius Springer.
 BOSTROEM, A., in *Handbuch der Geisteskrankheiten*, 1930, 4. Ed.: O. Bumke. Berlin: Julius Springer.
 BUMKE, O., *Lehrbuch der Geisteskrankheiten*, 1936. 4th ed. Munich: Bergmann.
 COOK, L. C., DAX, E. C., and MACLAY, W. S., *Lancet*, 1952, *i*, 377.
 GELLERSTEDT, N., *Upsala läkaref. förh.*, 1933, **38**, 193.
 HOPKINS, B., and ROTH, M., *J. Ment. Sci.*, 1953, **99**, 451.
 KAY, D. W., and ROTH, M., 1955. Unpublished observations.
 KRAEPELIN, E., *Lehrbuch der Psychiatrie*, 1909-1915. 8th ed. Leipzig: Barth.
 LUNDQUIST, G., *Acta Psychiat. et Neurolog.*, 1945, Suppl. 35. Copenhagen.
 FEUCHTWANGER, E., and MAYER-GROSS, W., *Schweiz. Arch. Neurol. Psychiat.*, 1938, **41**, 17.
Idem, SLATER, E., and ROTH, M., *Clinical Psychiatry*, 1954. London: Cassell.
 NEWTON, R. D., *J. Ment. Sci.*, 1948, **94**, 225.
 ROTH, M., and HOPKINS, B., *J. Ment. Sci.*, 1953, **99**, 439.
Idem and MORRISSEY, J. D., *J. Ment. Sci.*, 1952, **98**, 66.
 SJÖGREN, T., *Acta Psychiat. et Neurolog.*, 1948, Suppl. 52. Copenhagen.
 SLATER, E., *Proc. Roy. Soc. Med.*, 1936, **29**, 39.
Idem, *Z. Neur.*, 1938, **163**, 1.
 STENSTEDT, AKE, "A study in manic-depressive Psychosis", *Acta Psychiat. et Neurolog.*, 1952, Suppl. 79. Copenhagen.
 TENNENT, T., *Proc. Roy. Soc. Med.*, 1939, **32**, 98.
 WALTHER, B. H., *Die Psychiatrie der Hirngeschwülste und das Problem der Hirnlokalen Psychosyndrome und der psychischen Lokalisation*, 1951. Springer, Vienna.

AFFECTIVE DISORDERS ARISING IN THE SENIUM

I. THEIR ASSOCIATION WITH ORGANIC CEREBRAL DEGENERATION

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INTRODUCTION

THE importance of the psychoses of later life has been demonstrated by Cook, Dax and Maclay (1952), who found that 15 per cent. of patients admitted to mental hospitals in this country were aged 65 or over. Our own corresponding figure (derived from a Mental Hospital serving a county with a mixed rural and residential area) is 20 per cent. for the year 1953. Furthermore, it has been shown by Roth (1955) that about one-half of all admissions aged 60 and over are suffering from affective disturbances, and that of these over one-half have had no psychiatric illness before that age. Robertson and Brown (1953) report a similar proportion with late onset in their material.

There are a number of problems related to this large subgroup of affective disorders of late onset. Our previous investigations had shown that affective psychosis in old age differed from those with organic psychosis in the following respects: (1) Pattern of outcome with relatively high discharge and low mortality rates (Roth and Morrissey, 1952; Roth, 1955); (2) Psychological test performance (Roth and Hopkins, 1953; Hopkins and Roth, 1953); (3) The rarity of symptoms such as dementia, the amnesic syndrome, or prolonged clouding of consciousness in the clinical picture, even on follow-up study several years after admission. The results supported our hypothesis that affective disorder in old age is a separate nosological entity with evidence that is objective and independent. But although the findings suggested affinities between old age affective disorder as a whole on the one hand, and the manic-depressive and other functional affective illnesses of earlier life on the other, it remained to be ascertained whether the features described were equally characteristic of those cases suffering their first attack after the age of 60, and of those falling ill for the first time in early and middle life. The possibility remained, for example, that an organic factor in the aetiology of the group of late onset was concealed by dilution with cases in which this was unlikely to enter. A comparison of the two groups could therefore be expected to reveal whether cerebral degeneration was likely to be important as a cause of those affective illnesses that first appear in old age. Moreover, if the results suggested that the organic factor was unimportant and that the two groups were uniform in this respect, further comparisons might yet

bring to light factors associated to a significant degree with breakdown early or late in life.

It is with an examination of the possible part played by organic cerebral degeneration in the group of late onset that this paper is concerned; in the remaining papers of this series, the evidence obtained as to the importance of other factors, hereditary and environmental, will be described.

METHOD

Patients suffering from affective disorder were divided into two groups as follows:

1. *An early onset group* in which the first attack of psychiatric illness occurred before the age of 60.
2. *A late onset group* in which there was no record of psychiatric disorder before 60.

The former group was considered for practical purposes to represent the manic-depressive and other functional affective psychoses; the latter, depressive illness occurring in the senium in which cerebral degeneration might be an aetiological factor. This involved an assumption that the group of early onset was likely to be largely free from organic taint. That this is probably true, is shown by a number of lines of evidence. No genetic relationship between manic-depressive and organic psychoses has yet been demonstrated (Sjögren, 1948; Stenstedt, 1952) and the incidence of dementia among groups of manic-depressive patients has seldom been placed higher than 1 per cent., a figure which can be accounted for in terms of fortuitous coincidence (Lundquist, 1945; Sjögren, 1948). In relation to our own material it is in the decade 50-59 years that cases of doubtful aetiology would have arisen. Of the 29 per cent. of the early onset group that had their first illness in this period, only 9 cases relapsed within two years, while in the remaining 17 the mean interval until the next attack was $12\frac{1}{2}$ years. Such long remissions largely exclude the possibility of organic cerebral causation for psychiatric symptoms, whereas frequent relapse is not necessarily incompatible with functional aetiology. Any organic taint in the early group is likely therefore to have been confined to rather less than 10 per cent. of the cases. However the possibility of bias due to organic causation of affective psychosis starting in middle age was examined (and eliminated) by an analysis of the results obtained.

Accordingly, we can examine our groups for clinical and psychometric evidence of degenerative change, and if the assumption that they contribute to affective disorder in later life is correct we ought to find them relatively more often in the late onset group. Also relevant to this problem in view of the different pattern of outcome between the functional and organic psychoses of old age (Roth, 1955) is a comparison of the follow-up results. The procedure here followed is, therefore, to compare the subgroups in detail in respect of:

- (1) Clinical signs of organic nervous system disease and cerebral involvement;
- (2) Psychometric test results;
- (3) Outcome. In each case comparable data are available for the organic psychoses.

SELECTION OF MATERIAL

Selection of cases for study was made for 367 consecutive admissions aged 60 and over during the 18 month period August, 1951, to January, 1953, and was based on the presence of a *manic or depressive symptom-complex* of at least a few weeks' duration. One hundred and eighty-nine cases were found to fulfil

these criteria, of whom 175 were considered to belong to the group of affective disorder proper, and 14 to the organic groups. The latter cases showed a mixed symptomatology consisting of a variable depressive mood change and sometimes typical depressive ideation in a clear organic setting (i.e. with dementia, a chronic amnesic syndrome, or with prolonged or fluctuating confusion); they are referred to as "mixed cases". There were 120 cases of senile, arteriosclerotic and acute confusional psychoses, and 58 cases with other diagnoses, admitted during the same period (Table I).

One-third of all cases were studied individually, and the remainder from their hospital records. Social histories were available in the majority.

TABLE I

*All Admissions Aged 60 and Over During 18-month Period, August 1951-January 1953.
The "Mixed Cases" are Referred to in the Text*

	Group of	Male	Female	Total
Affective Disorder		59	116	175
Senile, arteriosclerotic, and acute confusional psychoses		49	71	120
"Mixed Cases"		6	8	14
Other Admissions		13	45	58
Total		127	240	367

"Mixed" Cases. In the "mixed" group the affective symptoms were seen in nearly every case in the setting of arteriosclerotic psychosis. In a previous study (Roth, 1955) such cases were in fact classified with arteriosclerotic psychosis. They have, however, been included here, though under a separate heading, so as to ensure that no case that could conceivably have been diagnosed as affective psychosis was left out of consideration. It was felt also that the relative contribution of the early and late onset groups to these intermediate cases had some bearing on the problem under investigation, and might throw some light on the problem of overlap presented by these cases in which affective and organic features were combined. In 8 of these "mixed" cases organic features were present from the beginning of the illness; the remainder had exhibited a phase of affective disturbance lasting months or years before the appearance of organic symptoms, although features unrecorded in the notes might have betrayed an organic component in the illness at an earlier stage or at onset.

It may here be pointed out that we have not excluded *all* patients with organic signs from the affective groups proper. Allocation of cases to the organic groups were made only when the psychiatric picture itself had consistent organic colouring, with dementia, prolonged confusion, or the presence of an amnesic syndrome. Localized disease of the nervous system (such as unilateral tremor, an old hemiplegia, or paralysis agitans), or equivocal signs of cerebral disturbance such as mild degrees of memory defect, or transient confusion, did not contra-indicate a diagnosis of affective disorder. It remains pertinent therefore to examine the frequency of such conditions in our two groups; for although not warranting a diagnosis of organic psychosis proper, they could nevertheless point to organic cerebral degeneration as a factor underlying the affective disturbance, and one which might subsequently transform the clinical picture. A difference in the importance of organic factors in causation between the two groups ought moreover to be reflected in a difference in the frequency with

which features indicative of an organic psychosis proper as well as signs of cerebrovascular disease are observed at follow-up.

We have made no attempt to give separate consideration to cases of involutional depression. However, as already pointed out, any assumptions implicit in treating all cases of "early" onset as one group of affective disorders, for the purposes of our study, were tested in a number of ways.

Description of material—Numbers. Of the 175 patients with affective disorder proper, 86 belonged to the early and 89 to the late onset group. Of the 14 mixed cases, 5 belonged to the early and 9 to the late onset group.

Sex ratio. Males. The early onset group contains 64 males, of whom 21 belong to the early, and 43 to the late onset group. Of 124 *females* 70 belong to the early, and 54 to the late onset group. The difference in sex ratio between the groups is significant at the 1 per cent. level of chance.

Age. The mean ages of the two groups are significantly different at the 1 per cent. level (early onset group 65.7 years, late onset group 70.4 years). Table II shows the age and sex distributions in the two groups and in the mixed cases.

Previous psychiatric illness. Forty per cent. in the early onset group had had one, 30 per cent. two, and 30 per cent. three or more previous attacks before

TABLE II

Sex Distribution and Mean Ages in Two Groups with Affective Disturbance: in Each Group Cases Belonging to the Organic Psychoses are Shown Separately ("Mixed" Cases)

	Early Onset			Late Onset			Totals
	Affective	"Mixed"	Total	Affective	"Mixed"	Total	
Females ..	67	3	70	49	5	54	124
Males ..	19	2	21	40	4	44	65
Total	86	5	91	89	9	98	189
Mean Ages	65.6	67.2	65.7	70.2	72.3	70.4	68.1

the age of 60. Of the late onset group, about 38 per cent. had had attacks since the age of 60, but before the present admission. Forty per cent. of the early onset group had their first attack before 40 years of age, 24 per cent. in the period 40-49, and 29 per cent. between 49 and 60.

SYMPTOMATOLOGY AND MENTAL TEST PERFORMANCE

The findings described were present on admission or observed during the first few weeks in hospital.

1. *Symptomatology*

Clinical signs of intellectual impairment and cerebral disease. The frequency of signs and symptoms suggestive of organic disease in the two groups is shown in Table III. Memory defect and "Confusion" were recorded whenever even a question of their presence arose in the hospital records or interviews. By "confusion" is meant a state of diminished awareness causing impaired contact with, and incorrect interpretation of the immediate environment (e.g. disorientation); both these symptoms are, of course, often associated in severe and sustained form with organic cerebral disease. This incidence is relevant to the present problem, for although there is much evidence to suggest that transient confusion in the acute stage may occur in affective disorders of functional aetiology, its presence in old age, even in this form, is prone to be attributed to some organic contribution to the aetiology. Likewise, mild degrees of memory

impairment in old people are often attributed to early dementia. Thirty-three individuals (17 per cent.) showed one or both of these signs (memory defect, which was nearly always for recent events such as admission to hospital, was associated with confusion in all but three cases). It can be seen in Table III that despite the preponderance of organic cases (mixed cases) in the late onset group, the incidence in the two groups is almost identical. Among the affective

TABLE III

Symptomatology in Two Groups Aged 60 and Over with Affective Disorder. "Mixed Cases" Showing both Organic and Affective Features are Shown Separately

	Group of: Early Onset			Group of: Late Onset			Total
	Affective	"Mixed"	Total	Affective	"Mixed"	Total	
Memory defect	6	5	11	6	8	14	25
Confusion	10	5	15	8	7	15	30
Focal neurological signs	4	1	5	5	1	6	11
Dementia	0	2	2	0	2	2	4
Number of individuals affected	12	5	17	13	9	22	39
Total in Group	86	5	91	89	9	98	189

groups proper, confusion and memory defects were probably associated with the affective disturbance *per se* in 10 per cent. of cases, a figure which agrees closely with Lundquist's (1945) finding among 135 manic-depressive patients. Seven of our patients were suffering from manic or excited states.

Focal signs indicating recent central nervous system disease were found among 5 patients in the early, and 6 in the other group. Among the former one presented with an hemiplegia of two years' duration, another with hemiplegia and visual field changes of recent onset (mixed case), a third showed a unilateral tremor of nine month's duration, a fourth with bilateral tremor, and a fifth patient who died shortly afterwards, a possible extensor plantar response. Among the 6 patients in the other group one showed variable pyramidal signs and a visual field defect (mixed case), one transient loss of consciousness together with bilateral tremor thought to be of arteriosclerotic origin, two suffered from paralysis agitans and two showed unilateral extensor plantar responses without other gross physical signs. Finally, we noted the frequency of *dementia*, by which is meant a chronic progressive disorganization of personality and intellect, and which by the criteria used could have occurred only among the mixed cases. Four patients were found with this condition; one of these suffered from chronic mania which rendered the assessment of dementia somewhat uncertain; there was also a history of alcoholism. Two other patients had suffered depressive attacks before the age of 60 (at 36 and 55 years of age) and both exhibited atypical features. No patient exhibited the characteristic picture of uncomplicated senile dementia.

Summary. In the whole material 21 per cent. of cases show "organic signs", there being a slight preponderance in the late onset group. Exclusion of the mixed cases reduces this difference almost to zero and the incidence falls to 14 per cent. This figure includes cases with mild memory impairment and transient confusion only, which are compatible with severe affective disturbance *per se*, an interpretation which is supported by the results of the follow-up (q.v.). When mixed cases and those in whom the presence of a neurological lesion was uncertain are omitted from consideration, only 6 cases are left

showing unequivocal neurological signs, and they are divided equally between the two groups (one with an old hemiplegia, one with unilateral tremor, and one with bilateral tremor, in the early onset group; two with paralysis agitans, and one with bilateral tremor and transient losses of consciousness in the late onset group).

2. Mental Test Performance (Table IV)

The tests used were those described by Roth and Hopkins (1953), and Hopkins and Roth (1953). They consisted of an Information and Memory test, a Vocabulary test (Wechsler), and the Progressive Matrices (Raven), and were given before therapy was begun. Table IV gives the results for the groups of affective disorder proper (the mixed cases are excluded). One hundred and three

TABLE IV

Performance (Mean Scores) on 3 Mental Tests by Two Groups Aged 60 and Over with Affective Disorder. The Differences are not Significant. "Mixed" (Organic) Cases are not Shown (see Text)

	Groups With	
	Early Onset	Late Onset
Mental Tests:		
Information Test	16.0	17.0
Matrices	19.0	19.4
Vocabulary (weighted scores)	11.2	9.8
Number doing all 3 tests	33	37
Mean Ages	66.8	70.4
Total Tested	48	55

patients were tested of whom 71 had all three tests; the remainder were omitted on one or more tests, either because their psychiatric condition or specific defects made testing impracticable, or through factors beyond the psychologist's control. The differences between the groups are not significant ($P = > .05$). This is of special interest for the following reason: it is not uncommon when examining elderly patients with affective disorder to find signs such as mild memory impairment, some decrease in mental agility, or a reduced capacity for abstraction, which may be attributed to degenerative changes in the brain; these changes may then be held to be of aetiological significance for the disorder, and to influence its prognosis adversely. But the question arises whether signs of this kind, particularly when exhibited in a setting of affective disturbance, do in fact commonly herald the onset of an organic psychosis proper, or whether they fall within the normal range of decline in mental performance characteristic of growing old. Now, in the group with early onset normal degenerative changes no doubt occur but dementia is probably rare; the failure of our tests to show differences suggests that the degenerative changes in the late onset group, among the patients tested, also fell within the normal range.

If all individual performances are examined, *i.e.* including those of patients who did fewer than all three tests, five are found to fall within the senile psychotic range, as described by Hopkins and Roth (1953), in one or more of the tests. It is of interest to examine the clinical states of these patients. One of the two patients who belonged to the early onset group was "confused" and aurally hallucinated on admission. She performed poorly on the Matrices, which was unfinished and therefore regarded as unreliable. She has repeatedly relapsed, but shows no clinical evidence of organic disease. The other patient obtained very good scores on the Information and Vocabulary tests, and her difficulty on the Matrices suggested a perceptual rather than a generalized intellectual impairment; when re-tested after E.C.T. her score improved and she has remained

well for 18 months. Of the 3 patients in the late onset group whose performances fell within the senile psychotic range, one was severely depressed and "confused" and obtained very low scores on the Information and Vocabulary tests; after E.C.T. her performance improved, but her Vocabulary test score suggested high grade mental defect, which was not contraverted by the social history. She relapsed after discharge but has shown no clinical evidence of dementia. Another patient was confused in a setting of mania when tested; a few weeks later he had a series of fits attributed to cerebrovascular disease. The remaining patient was severely agitated; shortly after testing, during a course of E.C.T., she became aphasic and is now suffering from a mild arteriosclerotic dementia (see also section on Outcome, Cases 2 and 3). In the last case mentioned, agitation on admission was severe to the point of inaccessibility, and manic excitement with confusion made assessment difficult in the previous one. Thus, scores within the senile psychotic range were obtained either in cases in which complicating factors were present to influence the interpretation of test results, or in which symptoms probably due to cerebral arteriosclerosis made their appearance within a short time.

Mixed Cases. Only 7 of the 14 cases did all three tests and the results therefore are too few to tabulate. Five fell within and 4 just above the senile psychotic range on one or more of the tests.

Organic Groups. Of 71 patients with senile and arteriosclerotic psychoses tested during the same period, some have already been described by Hopkins and Roth (1953) and the performances of the remainder have been found to confirm these findings (Hopkins and Roth, to be published). About 4 patients out of 5 fell within the senile psychotic range in contrast to the affective groups.

In conclusion, a comparison of the symptomatology and mental test performance in two groups of affective disorder shows that they do not differ in the frequency of signs of cerebral involvement, but that both groups do differ significantly from the organic psychoses, to which the mixed cases tend to conform.

OUTCOME

The follow-up was conducted until 31 December, 1953. The mean period of observation was 20.5 months for both affective groups. Cases of organic psychosis admitted between the same dates were followed for a similar period. The outcome was assessed in two ways: (1) By allotting patients to one of the categories, Dead, In-patient, Discharged, in order to compare the broad pattern of outcome of the late onset group of affective disorders with the other affective and the organic groups; (2) By tracing the subsequent history of each patient and assessing his/her actual psychiatric condition at the time of contact (which was made by letter or by visit from the Psychiatric Social Worker) to record the occurrence of physical or mental deterioration, or relapse of affective disorder. Co-operation was good and only two patients are untraced.

(1) *Dead, In-patient, Discharged.* The outcome according to these categories is shown in Figure 1 at 6 months after admission and Table V after 9-27 months. It will be clear that the pattern of outcome in the two affective groups is *broadly similar* and is in sharp contrast to that in the organic psychoses. In view of the high mortality associated with the latter it would seem unlikely that cerebral disease could often be a cause of affective disorder in the group of late onset. A more detailed analysis reveals the following facts:

- (i) *Deaths.* After a follow-up period of 9–27 months 21 patients (22 per cent.) of the late onset group are dead compared with 7 (8 per cent.) of the other affective group. The difference is significant at the 1 per cent. level of chance. However, after excluding mixed cases the figures become 15 and 8 per cent. respectively. When correction is made for differences in age this difference fails to reach statistical significance. There is therefore unlikely to be any factor peculiar to the late onset group which adversely influences the chances of survival to an important degree. There are nevertheless some observations to suggest that the small difference in mortality may be a real one. But it is not due to cerebral disease. Evidence has been obtained (to be presented in the next paper) that physical illness is much more common among the late onset group, and that the difference cannot be accounted for in terms of the greater mean age of the patients in it. Moreover, analysis of the relevant case records reveals that a specific somatic illness was the cause of death in every case in the late onset group; in no case among the affective groups proper was a macroscopic lesion found in the brain at autopsy.

TABLE V

Outcome on 31 December, 1953 (Mean Period of Observation 20·5 Months) in Two Groups with Affective Disorder and in Group with Senile and Arteriosclerotic Psychoses

	Affective Group with: Early Onset			Affective Group with: Late Onset			Senile and Arterio- sclerotic Psychoses
	Affective	"Mixed"	Total	Affective	"Mixed"	Total	
Dead ..	7	0	7	14	7	21	50
In-Patient	13	4	17	11	1	12	17
Discharged	66	1	67	64	1	65	7
Total ..	86	5	91	89	9	98	74

- (ii) The in-patient and discharged categories in the two groups are similar (Table II).

Mixed cases. Among 14 mixed cases only two are discharged and seven dead, an outcome markedly different from the remainder of the material.

Influence of the "organic signs" on the prognosis. After excluding the mixed (organic) cases it is found that local or chronic central nervous system disease and doubtful signs of cerebral degeneration (mild degrees of memory defect and transient confusion, see Section on Symptomatology) do not influence the prognosis materially for the worse. In particular, clouding of consciousness which is often held to indicate an organic cerebral factor in psychiatric disorder does not alone justify a poor prognosis. When it is considered that acute confusion can reasonably be expected on account of restlessness, lack of sleep and inanition alone, to be associated with a higher mortality or a more chronic course, our results make it unlikely that the confusion shown by many of these cases arose from senile or arteriosclerotic degenerative disease. Only when there is evidence of other kinds that such disease exists is the outlook worse than in uncomplicated affective disturbance.

(2) *Psychiatric Assessment of Cases at Time of Follow-up.* The actual psychiatric condition at the time of follow-up contact irrespective of in- or out-patient status provides further information. Psychiatric illness was considered to exist if there was: (i) affective disturbance or hypochondriasis; (ii) confusional episodes, a chronic amnesic syndrome or dementia. Using these criteria, 29 per cent. were found to be ill, 18 per cent. to have recovered after

relapsing once or more often, and 38 per cent. of the whole material to have remained well after treatment.

Affective disturbance or hypochondriasis was present in 50 cases of whom 32 were suffering from chronic depression or mania (4 cases), and 18 had had periods of remission lasting for several months. These patients were equally distributed between the two groups.

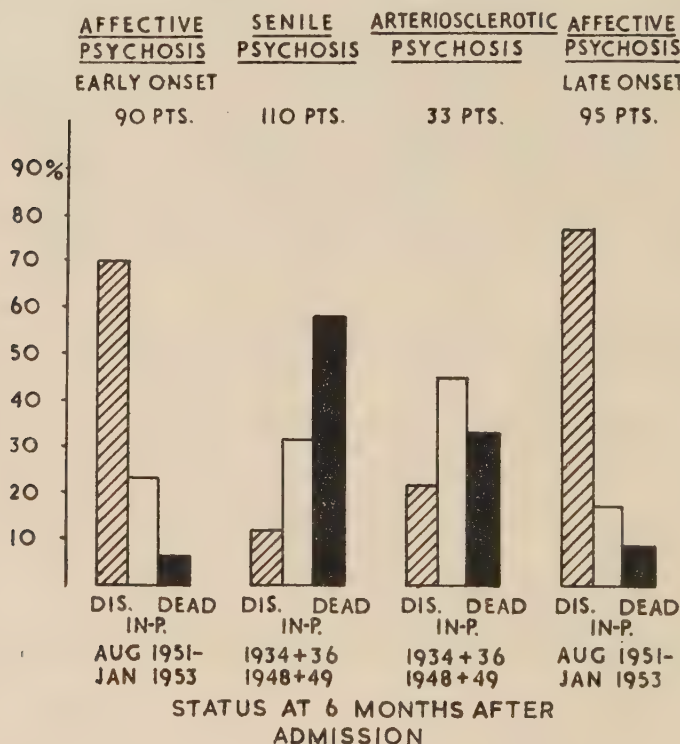


FIG. 1*

Organic psychoses were found in 8 patients out of the whole material (including the original mixed cases). Of these 8 cases, however, 2 had not previously been regarded as "organic" and therefore represent new cases:

Case 1. A woman of 75, was admitted in a state of severe agitated depression, and treated with E.C.T. during which she developed aphasia of a mixed type. She has remained aphasic and, in addition, has become euphoric and somewhat childish, but not grossly demented. (In-patient.)

Case 2. A man aged 86 was admitted with multiple somatic complaints of a few years' duration, and two months' depression with suicidal thoughts. He was in fair physical health, correctly orientated, and performed well on mental tests. He was discharged "recovered" after conservative treatment. Sixteen months later he was admitted to a general hospital with giddiness, unsteady gait, and urinary incontinence. There was generalized tremulousness, but no localizing signs in the nervous system. B.P. not raised. Physically he gradually deteriorated, and had to be spoon-fed. Mentally he was said to be occasionally confused at night; mood showed extreme dejection and anxiety about lack of progress, and fear of never being able to leave hospital. He was not demented. (In-patient, General Hospital.)

The first of these two cases was one to whom reference has previously been made in the section on intellectual tests. Her performance fell within the senile

* In this figure four "mixed cases" have been inadvertently excluded, one from the early and three from the late onset groups of affective psychosis.

psychotic range; she was exceedingly agitated on admission, became pale and shocked following each of two successive electroconvulsive treatments, and her aphasia and mild dementia were observed after her recovery from the last. The dysphasia has undergone improvement and the dementia has shown no tendency to progress during two and a half years' observation. The status of this patient is not certain but she has been classed as a case of cerebrovascular disease with mild dementia.

The second patient was not demented but his occasional nocturnal confusion was probably due to early arteriosclerotic psychosis.

A note was also kept of any cases that developed fresh symptoms or signs indicative of cerebrovascular disease, even where features of an organic psychosis were absent or uncertain:

Case 1. A man of 67 suffered from hypochondriasis, with mild depression, associated with a chronic sinusitis; B.P. on admission 200/115; 6 months later he had the first of several epileptiform fits. He did not develop focal signs or any impairment of memory or of habits. (In-patient.)

Case 2. A man of 71 was admitted in a manic state of sudden onset and was regarded as "confused"; he performed poorly on mental tests, and 3 weeks later he had several fits associated with transitory focal changes in the EEG. There is slight deterioration of habits in a setting of grandiose and overactive behaviour. The psychiatric picture is accountable in terms of mania.

There are thus four new patients with fresh organic features; in three of them focal neurological symptoms or signs have appeared while two show the early stages of an organic psychosis. The cause is probably cerebral arteriosclerosis in each case and all four belong to the late onset group. The significance of this finding will be discussed at a later stage.

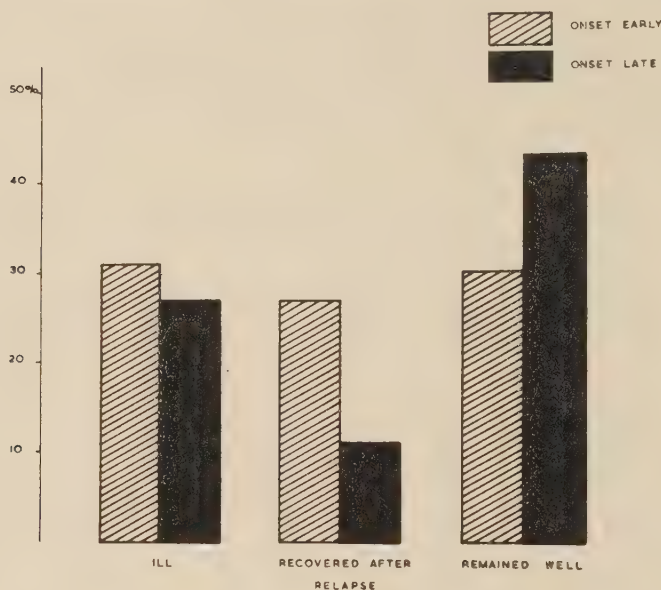
Relapse and Recovery. Examination of the relapse rate among those regarded as well on the 31 December, 1953, shows an interesting difference between the early and late onset groups. In the whole material of 189 patients 35 had relapsed once or more often and subsequently recovered, and 25 of these belonged to the early onset group. In 28 of the 35 cases the relapse had been severe enough to require re-admission to hospital. The early onset group, in fact, because of their higher relapse rate, spent in all rather longer in hospital during the observation period than the other group. Of the 72 patients *remaining well* after discharge (39 per cent. of the whole material) 30 per cent. belonged to the early and 43 per cent. to the late onset group. Of the mixed cases only one was considered to be well 16 months after admission.

DISCUSSION

1. *Affective Disorder of Late and Early Onset, and Cerebral Disease.* The comparison between the late and early onset groups reveals no difference between them in respect of clinical signs and symptoms indicative of cerebral disease at the time of admission to hospital. In psychological performance the two groups were likewise closely similar. But four new cases of cerebrovascular disease, two of them with organic features in the psychiatric picture, came to light during follow-up; all were of the group of late onset. This finding requires evaluation as also the presence of cerebrovascular or local neurological signs in a small proportion of cases in each group and the existence of a mixed group in which some cases begin with a typical affective psychosis.

With regard to the two new cases of organic psychosis this development is not peculiar to affective disorder of late life. In a previous study (Roth, 1955) two out of four cases in whom an organic dementia supervened have had typical

depressive psychoses in early life (34 and 41 years). In the present series the two "mixed" cases with dementia have had a depressive illness when aged 36 and 55 respectively. Nor are neurological complications of cerebrovascular disease without mental changes confined to the late onset group. The fact that all four new cases of cerebrovascular disease came from the late onset group may therefore be due to its exposure to a greater risk of developing this complication



PSYCHIATRIC CONDITION IN TWO GROUPS WITH AFFECTIVE DISORDER
9-27 MONTHS AFTER ADMISSION

FIG. 2

owing to its higher mean age. That the association between affective psychosis and cerebrovascular disease may be a fortuitous one is suggested in particular by the histories of those mixed organic cases that commenced with an affective psychosis in early life.

Case 1. A woman aged 67 was admitted with a five-month history of an illness that initially showed depressive and paranoid features. She presented on admission with a fatuous mood, marked memory impairment and disorientation in time, bizarre paranoid delusions and deterioration of habits. She had had a depressive illness at the age of 47 from which she had made a complete recovery. Her first relapse had not appeared until 8 years later.

Case 2. A man aged 70 was admitted with one year's history of forgetfulness, disorientation, and recent incontinence; there had been several outbreaks of violence and he had attempted to commit suicide by climbing out of the window. He had had an attack of depression at the age of 58 following a physical illness. His first relapse did not occur until 11 to 12 years later.

Case 3. A woman aged 68 was admitted with progressive dementia of some three years' duration. There had been rapid deterioration and marked memory impairment in recent months. There was a history that she had "never been the same since the age of 22 when the first child was born". At 55 she was treated in a private mental hospital for a depressive illness. Following this she worked as a secretary for ten years.

It would seem unlikely that the affective psychosis in these cases could have been due to cerebrovascular disease which had remained dormant until the

appearance many years later of an organic psychosis. In such cases the aetiological independence of the two conditions seems particularly clear. It may be that the situation is not really different in affective disorder of late onset except that postponement of the age of manifestation creates a spurious impression of causal relationship with any cerebral degenerative process that may happen to be coincident.

However even if there is no direct aetiological relationship between cerebrovascular disease and affective disorder of late onset there is evidently some slight hazard of cerebrovascular disease developing in affective psychosis whether this commences early in life or in old age. We cannot assume that the association is wholly fortuitous unless there is evidence to suggest that it is of an order accountable in terms of chance expectation. Such evidence does in fact exist. In a study of a random sample of normal old people whose age composition was similar to that of our total affective group (except that 65 was the lower age limit for males), Sheldon (1948) found 4.4 per cent. of cases with neurological lesions due to cerebrovascular disease. There were in addition 2.1 per cent. of cases with a severe tremor. The incidence both of cerebrovascular disease and total neurological disorder is therefore slightly in excess of that in our affective groups even if all mixed cases are reckoned. Sheldon also reports "severe mental deterioration" in 3.8 per cent. of his sample as well as 11 per cent. with a slight impairment of mental faculties. Here comparison is more difficult owing to ambiguities attaching to the standards of classification. But with this reservation in mind his figure of 3.8 per cent. may be compared with an incidence of 4-5 per cent. of cases with organic psychiatric symptoms indicative of cerebral disease in our material when all cases are reckoned except those of the mixed group that were unequivocally organic from the beginning of the illness. The affective psychoses proper showed on follow-up an incidence of only 1.1 per cent. with organic psychoses and periods of observation as long as 5 years do not increase this beyond 2.5 per cent. (Roth and Collins, 1954).

Now, it has been suggested on the basis of rather inconclusive evidence that the pyknic or eurymorph build is associated not only with manic-depressive psychosis but also with cerebrovascular disease (as well as diabetes, nephritis, dropsy, alimentary disease, etc.) (Cohen, 1940). In a previous study (Roth, 1955) a relatively high incidence of affective symptoms in cases of arteriosclerotic psychosis (30 per cent.) was found and one of the possible explanations suggested was some degree of association between the predispositions to cerebral arteriosclerosis and affective disorder. The results of the present study speak against any such association. Some alternative explanations for the combination of clinical features suggest themselves. It may be that the loosely knit and fleeting affective symptoms commonly found in arteriosclerotic psychosis have little to do with the specific predisposition that probably underlies affective psychoses proper (Slater, 1936); or that the greater likelihood of mixed cases coming under observation explains the association observed.

Both these explanations may be relevant, but they are not entirely satisfactory. It is not clear for example why arteriosclerotic dementia rather than senile psychosis, a common disease, tends to complicate a small proportion of affective disorders of old age. The association of these last two conditions is very uncommon; thus it is rare to find any affective colouring or a previous history of depressive illness in senile psychosis. One reason for this may be that since arteriosclerotic psychosis is a condition of rather earlier onset, cases of affective disorder are exposed to the risk of developing it rather sooner than to the hazard of senile psychosis. Now, we know that the mortality of affective psychosis is

significantly higher than that of the normal population (Alström, 1942; Stenstedt, 1952). It is possible therefore that far fewer cases survive to the age of maximum risk for senile psychosis than are alive to suffer the hazard of cerebrovascular disease. But these are evidently matters for further investigation.

2. *Pattern of Outcome.* Despite its slightly higher mortality and the small excess of cases with cerebrovascular disease, the comparison of the general pattern of outcome in the two groups is considerably to the advantage of the group of late onset. The patients in it relapse less often, they spend a shorter time in hospital and a higher proportion remain well. If, therefore, it were reasonable to assume that the pattern of outcome for the group of early onset represented the fate of cases of affective disorders of largely functional aetiology the other group would *a fortiori* deserve to be regarded as of similarly benign causation. However, it was evidently necessary to check this assumption by a further analysis of data. This was done by comparing the outcome of those in the early onset group, whose first attack had occurred before 45 years, with those who fell ill after this age. The pattern was very similar in the two groups with the majority discharged and very few dead; a comparison by the χ^2 test was consistent with the hypothesis that they came from a homogeneous population. Nor could any significant difference be found in the incidence of organic signs or in performance in psychological tests.

The data about outcome may, therefore, be interpreted as arguing strongly against any important contribution by cerebral degeneration to the causation of late life affective disorders. It is true that affective symptoms, even when connected with indubitable cerebral disease, may remit spontaneously or improve with electroconvulsive therapy, a fact which has led certain authors (Gallinek, 1947, 1948) to suggest that the presence of organic cerebral lesions in association with affective disorders is no obstacle to sustained recovery with E.C.T. This is probably an over-optimistic view of the position. In the first place stricter diagnostic criteria would probably have led to a diagnosis of senile or arteriosclerotic psychosis in only a proportion of the cases reported. The remainder would appear to have been affective disorders in old age with extensive peripheral and retinal arteriosclerosis, and these are not a reliable indication that degenerative changes are proceeding in the brain itself. In our own experience, as already described, the small proportion of cases in which indubitable signs of a progressive cerebral degenerative process are associated with an affective symptom-complex show a high mortality, and even when they survive for a period rarely sustain any improvement; for although their affective symptoms may be temporarily relieved by E.C.T., the negative symptoms arising from degeneration are not. The affective symptoms tend to show a less sustained response than in ordinary cases of affective disorder.

In fact, while the findings underline the benign character of affective disorder in late life, they also make it necessary to emphasize the importance of making the distinction between these cases and the small group of mixed conditions in which affective symptoms are seen in the setting of an organic psychosis, nearly always associated with cerebrovascular disease. Whereas confusion in the acute stage, some degree of memory impairment and local neurological signs do not seem to affect the prognosis adversely, prolonged or fluctuating confusion, an amnesic syndrome or dementia associated with affective symptoms carry a very high mortality. Treatment in these cases is attended with hazards of a quite different order from these associated with

affective psychosis proper in old age, and may call for decisions of considerable difficulty.

The great majority of patients with an affective symptom-complex in old age are free from the features associated with the mixed group; and the high proportion of patients well on follow-up and the relatively low incidence of relapse in this general run of affective cases make it unlikely that the contribution of cerebral degeneration to their aetiology can be of much importance. This view is reinforced when it is borne in mind that affective disorder in fortuitous association with some cerebral degeneration which aggravates the disability may be more likely than uncomplicated affective illness to present for admission to a mental hospital.

When the evidence that has been obtained here is integrated with other data we have obtained about late life affective disorder a consistent picture emerges. Thus, other investigations have shown that the group of early onset have a greater loading with neurotic symptoms and a significantly higher proportion of relatives with neurosis than the late onset group, although the incidence of specific psychotic illness among first degree relatives of the two groups is similar. This suggestion that the latter are a less vulnerable and better integrated group of individuals is confirmed by the greater stability that attaches to their recoveries. These facts suggest that the existence of the group of late onset is due to postponement of the age of manifestation of a predisposition to mental illness similar to that possessed by members of the other group. In other words appearance of affective disorder for the first time in old age is a measure of resistance or, from the point of view of the genetic contribution to causation, diminished penetrance of the responsible gene, rather than an indication of organic disease of the brain. Finally the factor that has been identified as an exogenous cause of breakdown in those who have avoided illness in early life is physical illness. These data will be presented in the succeeding papers of this series.

SUMMARY

1. The association of cerebral degeneration with affective disorder arising for the first time in the senium has been examined by comparing two groups of patients, (a) those who had fallen ill for the first time before 60, and (b) those in whom the first attack had occurred at the age of 60 or later.

2. The two groups showed a similar incidence of signs indicative of or liable to be attributed to cerebral disease. Nor is there any difference between the two groups in respect of mental test performance. Cases of affective disorder of both early and late onset are exposed to some risk of suffering from cerebrovascular disease in old age. A review of the relevant evidence suggests that this is probably no greater than the risk in the normal population; the slight excess of cases with cerebrovascular symptoms found in follow-up of the group with late onset is likely to be due to its greater mean age. But further investigations into a possible association between cerebrovascular disease and affective symptoms are indicated.

3. The pattern of outcome of the two groups is closely similar with high discharge and low mortality rates, which sharply differentiate them from the organic groups proper. But attention is drawn to a small group of "mixed" cases which carry a far worse prognosis.

4. There is reason to believe that the slightly greater mortality of the group of late onset represents a real difference though it is not significant. It is linked with the higher incidence of physical illness of this group; the aetiological role of this is examined in another paper.

5. The conclusion is reached that cerebral degeneration of the kind found in the senile and arteriosclerotic psychoses is unlikely to be an aetiological factor of any importance in the causation of affective psychosis in late life, whether or not this appeared in the senium for the first time. Depressive or manic psychosis of late onset may be regarded together with affective disorders of earlier life as forming a nosological entity distinct from psychoses with cerebral degeneration.

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REFERENCES

- ALSTRÖM, C. H., "Mortality in Mental Hospitals with especial Regard to Tuberculosis", *Acta Psychiat. et Neurol.*, 1942, Suppl. 24.
- COHEN, J. I., "Physical Types and their Relation to Psychotic Types", *J. Ment. Sci.*, 1940, **86**, 602-623.
- COOK, L. C., DAX, E. C., and MACLAY, W. S., *Lancet*, 1952, **1**, 377.
- GALLINEK, A., *N. Y. J. Med.*, 1947, **47**, 1235.
- Idem*, *J. Nerv. Ment. Dis.*, 1948, **108**, 293.
- HOPKINS, B., and ROTH, M., *J. Ment. Sci.*, 1953, **99**, 451.
- Idem*, 1954. Unpublished observations.
- LUNDQUIST, G., *Acta Psychiat. et Neurol.*, Suppl. 35, 1945. Copenhagen.
- REGISTRAR-GENERAL, *Annual Report*, 1951; *Census of Great Britain*, 1951.
- ROBERTSON, E. E., and MASON BROWNE, N. L., *Brit. Med. J.*, 1953, **2**, 1076.
- ROTH, M., *J. Ment. Sci.*, 1955, **102**, 281.
- Idem* and COLLINS, J. To be published.
- Idem* and HOPKINS, B., *J. Ment. Sci.*, 1953, **99**, 439.
- Idem* and MORRISSEY, J. D., *J. Ment. Sci.*, 1952, **89**, 56.
- SHELDON, J. H., *The Social Medicine of Old Age*, 1948. Published for the Trustees of the Nuffield Foundation, Oxford University Press, London.
- SLATER, E., *Proc. Roy. Soc. Med.*, 1936, **29**, 981.
- SJÖGREN, T., "Genetic-Statistical and Psychiatric Investigations of a West-Swedish Population", *Acta Psychiat. et Neurolog.*, Suppl. 52, 1948. Copenhagen.
- STENSTEDT, AKE, "A Study in Manic-depressive Psychosis", *Acta Psychiat. et Neurol.*, Suppl. 79, 1952. Copenhagen.

A NEW HALLUCINOGEN: 3,4,5-TRIMETHOXYPHENYL- β -AMINOPROPANE WITH NOTES ON THE STROBOSCOPIC PHENOMENON*

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3,4,5-Trimethoxyphenyl- β -aminopropane (TMA) is structurally related to both amphetamine and mescaline, as is shown in Figure 1.

Because of this structural relationship of TMA and amphetamine, methedrine, and mescaline, one could anticipate a clinical response to the compound which would represent certain phenomena characteristic of each of these drugs. This presented an intriguing problem as to whether or not, in actuality, this would be the case.

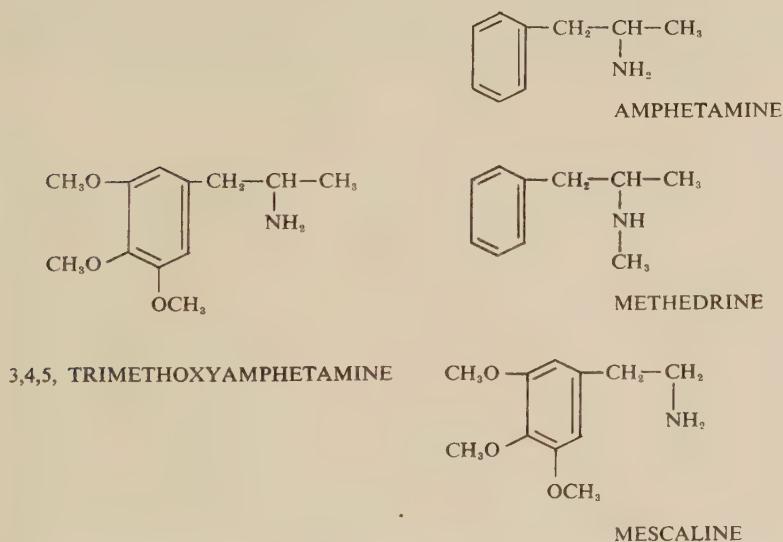


FIG. 1.—Structural similarities of TMA, amphetamine, methedrine and mescaline.

Amphetamine is a central nervous system stimulant which raises the blood pressure, causes sleeplessness, and is said to place the majority of subjects in a more communicative frame of mind (Grahn, 1950). It is not reputed to produce

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a "model psychosis" in a single dose. Methedrine has been reported to produce hallucinations in a single dose of 100 milligrams (Fischer, 1954) and in a single dose of 60 milligrams in schizophrenic subjects (Liddell and Weil-Malherbe, 1953). It also increases the ease by which a person can communicate his emotional problems. It has been used as an adjunct to psychotherapy, but it has the disadvantage that it produces tachycardia and hypertension. Methedrine is contraindicated in hypertension, heart disease, and thyrotoxicosis.

Mescaline is a central nervous system depressant, and causes visual hallucinations when administered in adequate doses. The hallucinations represent, to some extent, a bringing to the foreground of past experiences which had highly impressed the person (Stockings, 1940). The question is now brought to mind: Would a structure which combined all the structural aspects of amphetamine and mescaline manifest itself clinically by increasing the ease of communication of emotional problems, while at the same time producing hallucinations similar to those produced by mescaline? It is true that mescaline does in some cases increase communication, but this effect is not constant. Furthermore mescaline has been known for over fifty years and has not been used as an adjunct to psychotherapy to any extent. Possibly the reason for this has been that investigators seem always to have used large doses (200-400 mgm.). The effects of smaller doses of mescaline are not fully known.

There are so few hallucinogens known that we must study intensively the types of subgroups and molecules which cause hallucinations if we are to come to any understanding of the phenomenon itself.

3,4,5-Trimethoxyphenyl- β -aminopropane (Trimethoxyamphetamine, TMA) was first synthesized by Hey in 1947 (Hey, 1947) who was impressed with its euphoric properties (private communication). The Imperial Chemical (Pharmaceuticals) Limited, of Manchester, very kindly prepared a supply of this compound for us.

We tested the toxicity of TMA by administering it intraperitoneally on mice. Our doses ascended from 5-80 mgm./kgm. body weight in geometric progression. Five mice were studied at each dosage level. There were no deaths within 48 hours in any group. The only signs of toxicity were tremors over the body, and an intermittent scratching of the ears with the hind paws, at a very rapid rate, starting with the 20 mgm./kgm. group. Both these signs were maintained for seven hours, after which time they passed off with no apparent ill effect. These mild toxic signs started with a proportionate dose 15 times that needed to produce hallucinations in humans.

After the toxicity had been established in mice a series of experiments was run on dogs. These were planned to show effects on blood pressure, pulse rate, respiration, and the response to various anticipated antidotes. In four Nembutal-anesthetized dogs, which had a manometer cannulated into the carotid artery for blood pressure readings, we found that so long as the TMA was administered intravenously at a rate less than 6 mgm./minute there was no change in blood pressure or respiration, even after 420 milligrams had been administered (equivalent to 36 mgm./kgm. body weight in one dog). If the drug was given intravenously at a rate in excess of 10 mgm./minute there was a sudden drop in blood pressure of approximately 40 mm. Hg (Fig. 2). If the drip was continued this drop in blood pressure was found to be self-limiting, starting to rise again, but at a very slow rate. If the intravenous drip was stopped, as indicated in Figure 2, there was a rapid rise in blood pressure to its normal base line. It was found, as would be expected, that with this drop in blood pressure there was a corresponding increase in heart rate. If the drip was not stopped after the fall

in pressure the administration of adrenaline, amphetamine, or neosynephrine would instantly raise the blood pressure above its normal base line (Fig. 3).

In most of these dogs there was no mydriasis noted but this could be explained on the basis of the Nembutal used.

Amphetamine in doses smaller than the dose of TMA used caused a rapid

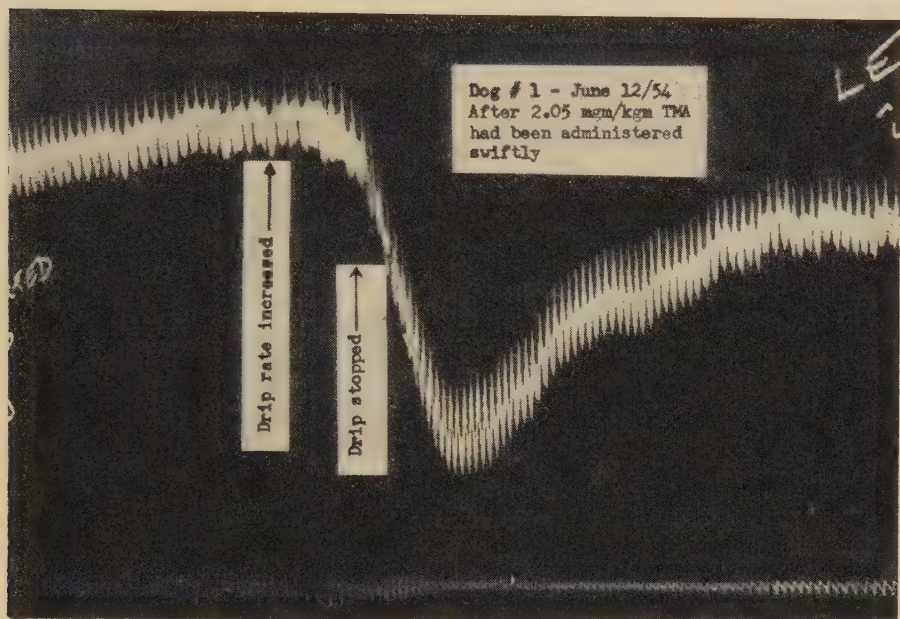


FIG. 2.—The effects on blood pressure and respiration in a dog after administration of TMA at a rate in excess of 10 mgm./minute intravenously.

rise in blood pressure when given intravenously (Fig. 3). This is interesting since it would be either one or more of the three methoxy groups which is responsible for this reverse action from amphetamine. The effects of mescaline on blood pressure are not well known. However Stockings (1940) reports a slight rise in blood pressure with large doses of mescaline by mouth. Chaumerliac and Roche (1949) report a marked vasodilatation of the cutaneous and retinal vessels with unspecified amounts of mescaline given to prisoners at Dachau in 1944.

We then administered TMA intravenously to unanaesthetized dogs. If the drug is administered in a fairly concentrated solution (20 mgm./ml.) we found that after 1.2 ml. had been given (24 mgm.) the dog would react with a non-productive heaving of the abdomen for a few moments and then present an acute "catatonic" reaction which lasted for the next 2 or 3 hours. During this phase the animals had all four limbs on the ground, their heads cocked at a slight angle, and a marked droop to the head. Their tails were kept between their legs. Within a few minutes of the onset of the "catatonic" phase the animal would start to sway from side to side but never falling. The dog would not respond to calling. On pulling on the dog's leash the animal would walk a few steps and then stop, assuming the same position described above. As the dogs walked they showed an ataxia but seldom fell, recovering rapidly when they did. A mydriasis was noted in each case. After 35 or 40 minutes the animal would lie

down, after which it could only be encouraged to stand up with a great deal of prompting. We found that although the animals appeared to be aware of their surroundings they did not respond to painful stimuli. Respirations were normal and regular.

Amphetamine had no effect on this "catatonia", but Nembutal (5 mgm./kgm. body weight) appeared to relieve the reaction in about 20 minutes if given intravenously. When the animals were examined 24 hours later no signs of deviation from the normal could be found. During the period of recovery the animals were ataxic.

If the intravenous dose was given slowly in dilute solution no "catatonia" developed even after large cumulative doses had been given. There was, however,

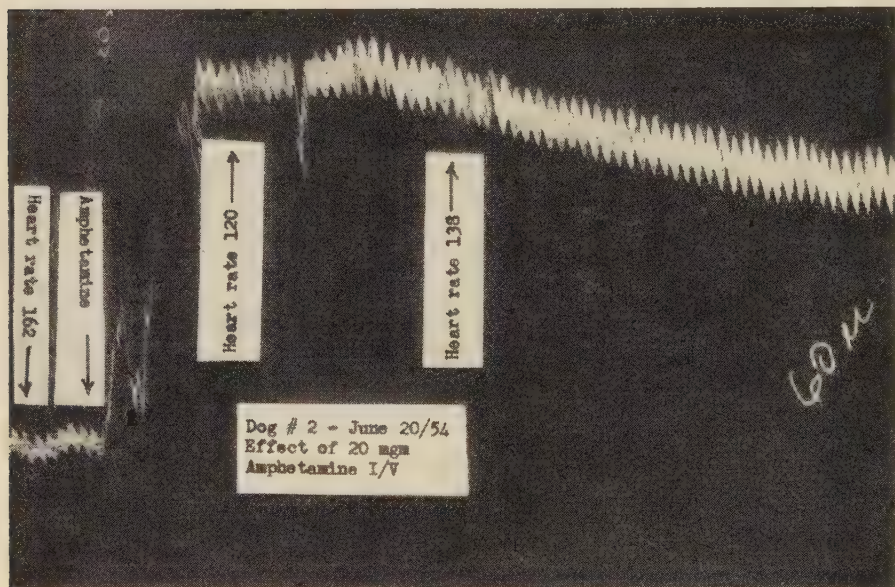


FIG. 3.—The effects on blood pressure of intravenous administration of 20 mgm. of Amphetamine Sulphate.

a marked ataxia. The animals recovered from this inco-ordination within 3 hours. There were no deaths, every animal appearing completely normal when examined 24 hours after administration of the TMA. Three dogs were used.

It was now felt that we had established enough information about trimethoxyamphetamine to be justified in administering it to human volunteers. We started with doses of 0.8–1.2 mgm./kgm. body weight (this was equivalent to a total dosage of 50–100 mgm. in the nine subjects used) by mouth and we found that in this range the following general syndrome was experienced:

About one hour after administration by mouth a slight transient headache was noticed. This passed rapidly, to be followed, in most cases, by a slight nausea which remained for 15 minutes to one hour. Occasionally this nausea was severe enough to discourage eating but in no case did a subject vomit. We found later that if 50 milligrams of beta dimethylaminoethyl benzohydryl ether 8-chlorotheophyllinate (Gravol, Dramamine), an anti-nauseant, were given 30 minutes before administration of the TMA, no nausea was experienced. One to two hours after administration by mouth of the TMA there was a sudden onset

of giddiness and the subjects would remark something like "I feel drunk or lightheaded". This was soon followed by an increase in movements, a rather marked increase in communicativeness, and a decrease in inhibitions. This phase remained for the ensuing 3 or 4 hours and then fell off rather rapidly so that 6-7 hours after the TMA had been administered there were no signs of abnormality. During this excitement phase the subject was slightly incoordinated, to the extent that he had to concentrate on what he was doing with greater intensity than normally and therefore he found that it was so much trouble to perform any muscular movements that he preferred to remain at rest in whatever position he found himself. After two hours the average subject presented a bilateral hyperreflexia in deep tendons and a rise in pulse rate by about 10 per minute, but no change in blood pressure. There was no significant change in blood pressure throughout the 24 hours succeeding the administration of the drug by mouth in any subject.

After administration of TMA at doses of 1.0-1.2 mgm./kgm. body weight, electroencephalographic recordings were made which showed very little change from the controls. The subjects on the above dose said that the experience was pleasing. None of them complained of any anxiety or discomfort aside from the slight initial nausea (which in subsequent subjects was combated with Gravol).

It was now decided to try to elicit hallucinations in subjects by use of a stroboscope stimulator. We administered a dose equivalent to 1.6 mgm./kgm. to a 22 year old white male. This subject was given an EEG before and after administration of the drug. During the control run the record showed a good regulation of the spontaneous tracings. The alpha rhythm was prominent and of good voltage, appearing symmetrical in both parieto-occipital regions with a frequency of 10 cycles per second. Recordings were carried out with the stroboscopic stimulator (eyes closed) at frequencies ranging from 4-20 c.p.s. There was a following of the alpha rhythm up to 12 c.p.s. The best response, with harmonics at 12, 18, and 24 c.p.s., was elicited with a frequency stimulation rate of 6 cycles per second. The second EEG was carried out 2 hours after oral administration of the TMA. On this record the spontaneous tracings were of much lower voltage and were not as well regulated. The alpha rhythm showed a tendency towards a faster rate, and frequencies of 11-12 c.p.s. appeared. The response to photic stimulation was more marked than previously. A response was noted up to 20 c.p.s. in short intermittent trains. Again the best response, with harmonics of 12, 18, and 24 c.p.s., was elicited in the 6 c.p.s. band.

Before administration of the TMA the subject saw small fine patterns of squares with fine lines, with the stroboscope set at an intensity 4 and frequencies varying from 4-20 cycles per second. The colours were predominantly white with some red and blue. The stroboscope was shut off, the TMA administered by mouth, and the subject allowed to relax for the ensuing two hours.

One hour after administration he felt "drunk" but claimed not to have the numbing effect around his mouth that he does with alcoholic intoxication. This subject had not been given Dramamine, therefore he experienced nausea and did not want to eat. He was shivering very slightly and said that he felt dizzy. He said that he did not want to stand up, but could easily sleep. The nausea subsided within one hour of its onset. He said that he felt "rubbery" in his legs and was "trembling slightly all over as if anticipating some daring feat".

Upon applying the stroboscope two hours after administration of the TMA, the subject, with his eyes closed, saw mosaics (which he described as being similar to those seen in the "movie version of Turkish Temples"), the letters of the alphabet, neon signs which raced up and down his field of vision as

on the marquee of theatres, green snow falling, gold and silver rain falling, and firework displays. All these were seen in various pastel colours. The subject denied any excessively bright colours. He said that he had never before seen some of the colours. He was intensely fascinated and said that the experience was most pleasing. He was talking rapidly, and in a loud voice described all these things without interjection by the examiner. The subject also saw several large catlike animals with "great fangs" which were green in colour. He claimed that these animals were not molesting him, but were simply in his field of vision. The subject described himself as being "in the middle of what I see". The scenes were in three dimensions which the subject said were so exaggerated as to be almost unreal.

The examiner wished to test the response of the hallucinations to suggestions given to the subject. He asked the subject if he had ever seen Shakespeare's *Hamlet*. Immediately the bright pastel colours of the subject's hallucinations were replaced by dark purples and blacks. He saw the figure of Hamlet standing upon a turret which was obviously made of wood (as on the stage). In the next instant he was asked if he could see natives in the South Sea Islands. Immediately the subject reported various bright colours: yellow, green, red and blue, and he visualized, in a most spectacular three dimensional view, the islands in the distance with United States Navy ships floating about the ocean. The correlation of this with the Broadway play *South Pacific* is clear. The subject was disturbed by the fact that there were bridges connecting the ships with the islands and that automobiles were riding over the bridges.

After all these phenomena were experienced we tried to elicit hallucinations without the aid of the stroboscope. We were successful to the extent that the subject saw various patterns and designs with his eyes closed. The subject remained euphoric and very communicative for the next two hours. He complained of weakness in his legs, especially around the thighs. As the euphoria wore off he complained of sleepiness. He was taken home by automobile and at this time showed signs of a paranoid reaction: He said that the driver was driving far too fast, although in reality the speed was 25 m.p.h., and that the driver was trying to alarm him by driving at this "excessive speed". He felt that people were looking at him and he even entertained the idea that possibly the examiners had arranged for these people to stare at him. This, however, lasted but a short while. All this while he had insight and when his intelligence was appealed to he responded well.

On trying to sleep, in the afternoon, five hours after administration of the TMA, he woke up at intervals because of nightmares that he was having while asleep. By 8 hours after taking the drug all its effects had worn off. The subject slept well that night, having no unusual dreams.

The next day the subject related to one of us that at one time during the previous day's experiment he had imagined that he was either dead or dying, but that suddenly the Queen Mother appeared in Royal Purple and at this he said to himself that he could not possibly be dead if the Queen Mother were alive. The experience made the subject anxious for a few moments.

Our next subject was a 22 year old white, rather extroverted, female. Before giving the TMA to this subject she was given 50 mgm. Dramamine. Fifteen minutes later we administered 100 mgm. of TMA by mouth. This was equivalent to 1.6 mgm./kgm. body weight.

Before administering the TMA we did a control run with the stroboscope set in the range 4-20 c.p.s. The subject saw a red dot in the centre of the field for the first few seconds. This was followed by predominantly white and black circles

or hexagons. The fields were always symmetrical. There was no suggestibility on the part of the subject. She stated that she usually dreamt in colour. The stroboscope was used in one minute bursts at fifteen minute intervals following administration of the TMA with the following results: After 15 minutes the stroboscopic stimulations elicited flashes and spots of red, blue, mauve, and black. The subject was not suggestible and showed no evidence of increased communicativeness. After 30 minutes there were no changes of note to report. The colours were as in the previous stimulation in this subject except that there was much more blue (cyanops) in the fields and a pattern of "plus signs" appeared. The field was entirely symmetrical. It is of interest to note the increased blue colouration or cyanops. Chaumerliac and Roche (1949) observed the same phenomenon in persons given large doses of mescaline. One hour after administration the subject saw more blues and the other colours were more prominent. The subject said that there was less symmetry in the patterns which she now saw. She was becoming suggestible, and said "If you were a modern artist you could have a wild time painting the things that I am seeing". One hour and 15 minutes after administration she said that she felt as if she had been to a cocktail party—by this she meant that she was light-headed. She experienced no nausea.

One hour and a half after administration of the TMA we elicited the first structured hallucination. The subject, with her eyes closed, was watching the stroboscope and she described the following scene: "A woman is walking down Fifth Avenue (or is it Park Avenue?), she has a dog with her." The examiner asked what kind of a dog and she answered, "It's a poodle. It's walking in front of her and she is walking away from me." The examiner questioned again, asking if the scene was in three dimensions. She answered, "Yes, in fact it's in six dimensions." When asked to explain this she did so by saying that there were objects which she could not describe which were spinning in various parts of her visual field with their axes of rotation through various planes. She then saw bridges "like the Golden Gate with sailing boats sailing in the blue water". The sea seemed to be prominent in all her hallucinations. She described the scenes as being sketched in fine penned India Ink which had been coloured in later.

The stroboscope was then shut off. The subject said that her muscles felt lax. She was talking excessively and laughed at trivial incidents. The subject did not hallucinate without the stroboscope. She presented a mydriasis but did not complain of poor vision.

Two hours after administration of the compound, the stimulator was again turned on and the scenes became more and more like strange patterns of brocade and prints on materials. She was extremely enthusiastic and said that it would be ideal for an artist or designer to have these kind of visions. The scenes were described as being in the form of a pie cut in six pieces, each piece contained a different scene and, at will (or from suggestion of the examiner after she had described the scenes to him), she could "go into one of these scenes and become part of it so that you are sitting in the middle of what is going on". She did this several times for us, describing flowers, print designs, wallpaper pattern designs, and many whirling patterns which were going in every conceivable direction.

Two hours and fifteen minutes after the TMA had been given the subject saw, with photic stimulation, an oriental bridge across a stream in an oriental garden. This impressed her greatly and she said that she could still see the scene, but that it was changing, even though the stroboscope had been shut off immediately after this scene had been elicited. The colours were beige, maroon and green. The whole was in an exaggerated three dimensional form. Then (with the stroboscope turned off) she saw cities which were large and displayed in front of

her eyes as if she were flying over them in an aeroplane. At this time the subject switched to designs seen on materials, which she kept describing in superlative terms. She kept remarking that "this is what poets and artists and designers must take to get their inspirations". She was talking excessively and continuously. On suggestion she saw among other things, jet aircraft flying over a city, fields of flowers, and many pattern designs.

About this time a Paisley design appeared in the foreground. We found that if the stroboscope were started while an hallucination was fixed and "steady" it would "break up" the vision and produce a Paisley design. All her visions were in three dimensions. She then presented hallucinations of being in various countries of the world, describing story book scenes from each country. Seven hours after the administration of the TMA the subject had returned completely to normal.

Our last subject, a 23 year old medical student, was thought to be particularly suitable for several reasons. He was an accomplished artist and could therefore paint his impressions of the hallucinations. He had also had the drug previously in a dose of 0.8 mgm./kgm., and had at that time become quite nauseated, so that this was a means of testing the effects of Dramamine as an anti-nauseant.

This subject was given 50 mgm. Dramamine, by mouth, half an hour before administration of 125 mgm. of TMA—equivalent to 2.0 mgm./kgm. for his body weight. His control stroboscope impressions, with his eyes closed and situated 2 feet from the lamp, had been black and red in colour and consisted of a perfectly symmetrical field which was perforated. Above 12 c.p.s. the field became more blue and the whole perforated field spun counterclockwise. Fifteen minutes after administration of the TMA there was no change in the response to the stroboscope. At 25 minutes the subject felt slightly lightheaded. There was no nausea.

Thirty-five minutes after administration, the stroboscope elicited black chevrons moving in from the four corners to the middle of the field (Fig. 4). The basic field was white. The rotation was said to appear more like a real wheel now, with spokes. There were both clockwise and counterclockwise rotations at



FIG 4.

different times. These seem to be correlated with the frequency of the photic stimulator.

In forty-five minutes the patient said he was "giddy" but showed no signs or symptoms of nausea. The stroboscope impressions at 50 minutes had not changed from what they were at 35 minutes. At 60 minutes the subject saw "wall-paper designs" and "bright blue whirls with showers of brilliant blue stars in the whirl". As the frequency of the stroboscope was increased to 8 c.p.s. the whole field started rotating. The colours were all in pastels with the exception of the brilliant blue mentioned above.

At 1 hour and 20 minutes the subject felt pleasantly excited and wished to laugh at insignificant things. At this time we gave 30-second bursts with the stroboscope (intensity 4 at 10 c.p.s.). With the first burst the subject saw snow flakes with red middle and black periphery. These snow flakes were falling all around him. There were tiny brilliant blue dots interspersed (Figs. 5 and 6).

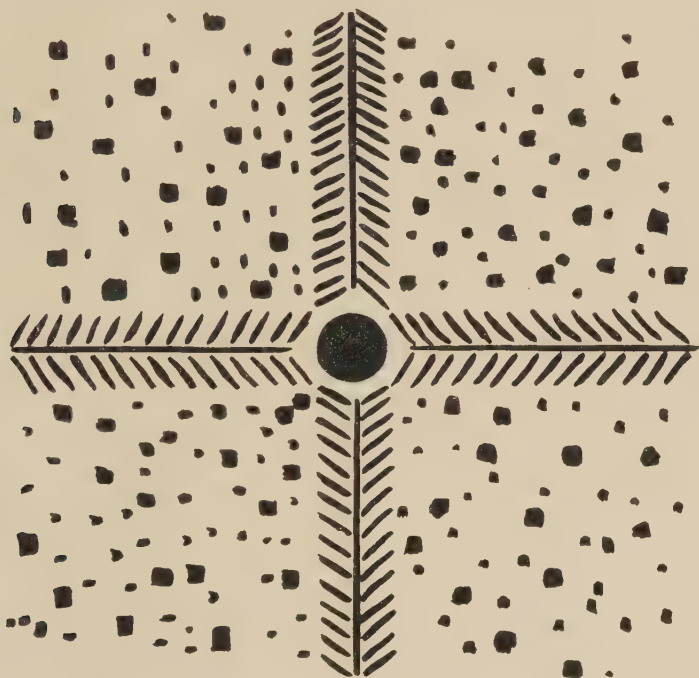


FIG. 5

The whole field was rotating. Then some yellow colours appeared for the first time in this subject.

After $1\frac{1}{2}$ hours he said, "I feel silly as hell but don't really care." The subject normally does not use profanity of this sort and cares very much if he is silly or not. The subject at this time stated that he felt that his temperature perception and taste were more acute than normal.

There was no effect noted on ordinary vision. His mydriasis responded to accommodation. The subject's pulse, in one and a half hours, had risen from 72 to 84. It did not rise above this latter figure at any time recorded, his blood pressure did not rise throughout the experiment.

At 1 hour and 35 minutes the subject reported snow flakes, similar to those

already seen, at photic rates up to 16 c.p.s. Above this figure the pattern remained, but the colours became brighter.

At 1 hour and 45 minutes the subject reported very slight visual distortion. This lasted only a few minutes. He showed a marked increase in his speed of talking. He reported that he felt euphoric and he certainly gave this impression to observers.

At 1 hour and 55 minutes he reported some "shadowy patterns" without the stroboscope "but the colours were much brighter with the stroboscope".



FIG. 6

Two hours after administration of the TMA the subject reported that he was very happy, felt slight tremors all over his body, and was not tired. So far the subject had seen no "real-life" scenes. They had all been patterns of a geometric nature. He had reported some hallucinations of "flashes of brilliant blue—like a welding arc".

At 2 hours and 40 minutes he saw a tunnel moving at a great rate and a great distance. He felt he was looking down this tunnel and this gave the effect of greatly exaggerated perspective. He kept talking about this "beautiful three dimensional effect". In this same hallucination he saw, for the first time, men standing on a spiral staircase. He thought that they might be "midshipmen preparing for their graduation at Annapolis (the United States Naval Academy), or a choir of men". The colours were rich reds and golds, with white and blue. He thought he was there while this was taking place—"it wasn't a picture". He felt that in the last few minutes the response to photic stimulation had changed: the scenes were from real life and were not symmetrical designs any longer.

We found that at this time he could hallucinate without the aid of photic stimulation. He saw façades of buildings in spectacular three dimensions,

Venetian architecture, a pool with explosions of brilliant amethyst and sapphire colours, peacocks' tails in iridescent colours, small streamlined fish, a chain of "plus signs" and red dots winding in and out of each other: a large number of black mice ran by at intervals. These and many similar scenes were experienced. Everything in the scenes was moving to and fro or across the field. The subject offered the information that he "got a modern interpretation of everything". By this he meant that many things were presented not as they really appeared in life but as a modern artist might present them. The subject is, as stated above, an amateur artist.

It is of interest to note that if the stroboscope was flashed in single flashes after an image had been formed without the stroboscope the general response would be that the initial complex image would be replaced by a more primitive one such as hexagonal designs or bright beads. This was not always the case. Exceptions were, for instance, that a flash brought the initial picture into sharp relief as though illuminated by a lightning flash, or a flash might initiate a series of red "plus signs" on a previous image of a blue tablecloth.

The subject stated that he felt very lax throughout the experience. He felt very pleasant, having not a care. Nothing could distress him. About 5 hours after administration he would see in his hallucinations anything that was in the conversation at the moment. He could do this with his eyes open or closed although he felt he saw more with his eyes closed. From the 4th to the 6th hour everything he looked at appeared to have a serpentine movement in it.*

At 5 hours he did not want to take the Nembutal offered to him when he was told that this would stop his hallucinations. However he was persuaded to take the capsule ($\frac{3}{4}$ gr.) of Nembutal. In half an hour he said he thought that the objects in the room weren't moving as much as before. One hour later he was almost normal except that when he closed his eyes he could have hallucinations. After the 8th hour he presented no abnormal signs or symptoms. That night he slept well with no unusual dreams. There was nothing unusual noted by the subject on arising next morning. All the subjects slept well after the experiment and did not have nightmares nor later recurrences of hallucinations.

We were interested in studying the excretion of TMA, by a modification of the spectrophotometric method of Woods *et al.* (1951). This is based upon the formation of a coloured compound when bromocresol purple is mixed with certain organic amines. This gives a yellow colour, the optical density of which, at 410μ , is proportional to the concentration of the amine (in this case TMA). By this method we found that:

1. During the first 2 hours after administration of TMA by mouth there was a minimal excretion (Fig. 7). This rapidly increased during the latter half of the first two hour period to maintain a fairly steady plateau during the next three hours. This plateau was formed earlier as the actual dose taken by mouth increased.
2. The proportion of TMA recovered from the urine during half hourly samples for 22 hours was between 20 and 35 per cent.
3. The drug was not detectable in the urine after 22 hours.
4. In all cases the drug was detectable in the sample of urine which was taken half an hour after administration of the TMA.
5. There was a correlation between the subjective feeling of "drunkenness" on the part of the subjects and the start of the rapid climb up to the plateau in the urinary excretion.

* This was the only change noticed by our subjects in their perception of the external world.

We wished to determine if the amine excreted was identical with that ingested. We did this by two methods: the urine of the subjects was extracted with chloroform and the picrate of the amine was produced. The melting point of this amine picrate was then determined and compared with the melting point of 3,4,5-trimethoxyphenyl- β -amino propane picrate. Both these compounds were found to fall in the range 188–190° C. A mixed melting point determination was then done and no depression of the melting point was found. We next calculated the theoretical amount of the compound which would be necessary

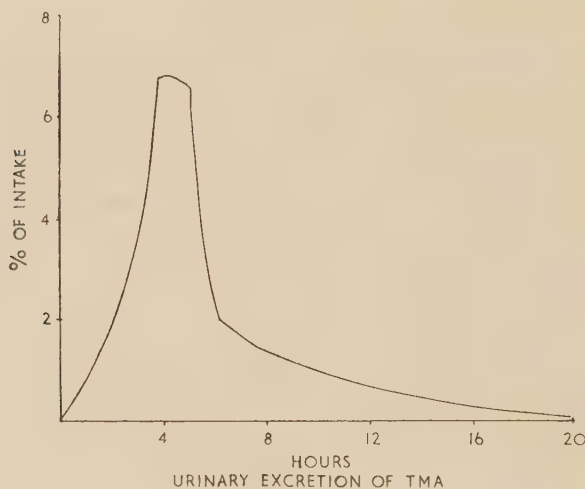


FIG. 7

to produce a certain quantity of nitrogen by the Kjeldahl method. When this quantity was weighed out and the Kjeldahl determination done we found a 4 per cent. relative error in the amount of nitrogen produced. This was well within the mechanical error of weighing. Both the above tests are not absolutely conclusive evidence, the amines having rather wide melting point ranges. The analytical procedures used showed that 65–80 per cent. of the ingested amine was not excreted as the original product. The other possible routes of excretion would be in the bile and perspiration. It is possible that this remaining 65–80 per cent. is metabolized in the liver and excreted as a breakdown product.

DISCUSSION

From the description given it will be noticed that TMA, as might be expected from its formula, produces symptoms similar to those produced by mescaline and amphetamine. The fact that it does not produce any hypertension and only a slight increase in heart rate, and that it does not interfere with sleep, may prove it to be superior to amphetamine and methedrine as adjuncts to psychotherapy. Caution however should be observed in its use, as with all such drugs, and a subject having taken it should be under constant supervision for 24 hours. He should not be allowed to drive an automobile for 12 hours following administration.

Blaschko (1940) has shown that amines with the group on the penultimate carbon of the side chain are inhibitors of amine oxidase. This enzyme is involved with metabolism in the higher brain and it is possible that the phenomenon of hallucinogenesis is involved with the inhibition of amine oxidase.

SUMMARY

1. The structural formula of TMA (trimethoxyamphetamine) lies between those of mescaline and amphetamine. It is nontoxic to humans in doses up to 2.0 mgm./kgm. of body weight. In mice it produced no fatalities in doses up to 80 mgm./kgm. of body weight. In lower doses (0.8–1.2 mgm./kgm.) in man it produced euphoria and a loosening of emotional restraint. In higher doses (1.6–2.0 mgm./kgm.) it caused visual hallucinations in addition.

2. In humans hallucinogenic doses produced no significant effect on the blood pressure or respirations, and only a mild increase in heart rate.

3. Very high doses (above 20 mgm./kgm.) in mice produced a tremor and a scratching of the ear with the hind feet. In anaesthetized dogs a large dose, given in excess of 10 mgm. per minute intravenously, caused a self limiting fall in blood pressure of about 40 mm. Hg. In unanaesthetized dogs it produced a catatonia-like condition when given by rapid intravenous injection.

4. The drug was not detectable in the urine 22 hours after administration by mouth. In humans the peak urinary excretion was between the second and fifth hours after administration by mouth. This peak fell off sharply after the fifth hour. Twenty to 35 per cent. of the ingested drug was recovered unchanged in the urine.

5. A single flash of light from a stroboscope will cause a change in the type of hallucination present at the instant of the flash:

- (i) The hallucination may change to a more primitive, less organized type.
- (ii) The previous scene may remain but with a difference in the lighting effect so that the patterns stand out in relief. Some details may be added to the pattern.

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REFERENCES

- BLASCHKO, H., *Nature*, 1940, **145**, 26.
 CHAUMERLIAC and ROCHE, *Lyon Méd.*, 1949, **182**, 167.
 FISCHER, R., *J. Ment. Sci.*, 1954, **100**, 623.
 GRAHN, H. V., *Am. Pract. Dig. of Treat.*, August 1950, 795.
 HEY, P., *Quart. J. Pharm. Pharmacol.*, 1947, **20**, 129.
 LIDDELL, D. W., and WEIL-MALHERBE, H., *J. Neur. Neurosurg. Psychiat.*, 1953, **16**, 7.
 STOCKINGS, G. T., *J. Ment. Sci.*, 1940, **86**, 29.
 WOODS, L. A., COCHIN, J., FORNEFELD, E. J., MCMAHON, F. G., and SEEVERS, M. H., *J. Pharm. Exper. Therap.*, 1951, **101**, 188.

PSYCHIATRIC TYPES: A Q-TECHNIQUE STUDY OF 200 PATIENTS

By

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PSYCHIATRY is handicapped in the task of evaluating new methods of treatment because it has had to tackle the problems presented by early and mild cases without modern psychometric methods. There is clearly something wrong when the spontaneous remission rate in schizophrenia can be reported by the New York State Hospitals as 59 per cent. (1944) at a time when the equivalent figure in Kent (Monro, 1950) was 24 per cent. The practical impact of this failure to define terms is that the majority of articles describing the results of new treatments lose most of their force. This happens most obviously when the cases considered are presented simply in diagnostic categories, for example, as x schizophrenics or y hysterics. The trouble can be lessened by giving more clinical detail, but seldom can enough diagnostic and prognostic information be given to enable the reader to arrive at a proper evaluation of the issues presented. New descriptive techniques are therefore an urgent practical necessity, as well as being theoretically desirable.

Fortunately, the application of modern psychological and statistical methods to psychiatric problems offers hope of progress to those who are not afraid of hard, slogging work. Fruitful suggestions are also to be found, such as one of Cattell's (1946, p. 13), to the effect that there are really only two basic concepts for the description of personality, namely types and traits. In his full discussion of the two approaches, the points most pertinent to this paper are as follows:

Trait psychology picks out a certain mode of behaviour and defines this as the expression of a trait. By using a comprehensive list of traits, and assigning to the individual a definite amount of each, it can describe him. The appropriate correlation technique is the one in most frequent use, namely R technique, in which traits (or tests) are intercorrelated for a population of N persons, to yield groups of positively correlated traits or correlation clusters.

Type psychology, on the other hand, picks out an individual who may be real, or an ideational composite of real observations, and uses him as a reference picture. The appropriate correlation method is Q Technique as described by Cattell (1946, p. 98). Stephenson (1936, 1952), who originated Q Technique, might object to Cattell's use of the term to denote the intercorrelation of persons on a "Population" of n traits, to yield types. I therefore wish to stress that it is in Cattell's sense that the term is used in this paper. In view of difficulties which I have described elsewhere (1953), which arise when the word "Type" is loosely used, I would further emphasize that Q Technique does not yield a "Type" whose identification depends on the presence of a group of prominent traits irrespective of their setting. It yields a reference picture of a whole individual, which includes all his traits, or, more accurately, all those included in the scope

of the enquiry. This study deals with types in this sense, in which the total configuration of the traits present in each patient is taken into account.

Before proceeding further, it is only fair to consider the viewpoint that type psychology has had a good innings, and that its domination of clinical psychiatry is the factor principally responsible for retarding progress in description and classification. There is much to be said for this contention, which, if true, would point to trait psychology and R Technique as the method to follow. It must be admitted that type psychology is embedded in the concepts of authorities as varied in outlook as Kraepelin (1913), Jung (1923), Kretschmer (1921), Sheldon (1942) and, of course, Adolf Meyer. Yet it is also true that there are strong criticisms of, and movements away from, the formal clinical discipline which has taken shape from the work of such men as those just quoted.

1. Henderson and Gillespie (1952) say that diagnosis as an exercise in classification does not matter, as the psychiatrist's aim is to understand the case. This is a clear and authoritative rejection of the usefulness of classification by type, as well as being a stumbling block to general physicians, who cannot assimilate such trifling with the fundamental discipline of diagnosis.

2. In practice, most clinical psychiatrists select treatments on the presence of certain trait-groups. For example, E.C.T. is recommended for the depressive group of traits, and leucotomy for "a fixed state of tortured self-concern", largely irrespective of the setting in which these states occur. Likewise, they estimate prognosis on extrinsic factors such as the quality of the previous personality or the mode of onset. So diagnosis, in the sense of establishing the type to which the patient belongs, may have little bearing on the clinician's two principal jobs of selecting treatment and forecasting the outcome. Thus type psychology is tacitly jettisoned, and another potential gulf between psychiatrist and physician is revealed, for in general medicine diagnosis is the essential preliminary to prognosis and the prescription of treatment.

3. Psychologists assail the process of psychiatric diagnosis as hopelessly inaccurate. Eysenck (1952) states that the reliability of psychiatric diagnosis, at its best, is of the order of 0.50. He calls Kelly's Michigan study "A devastating comment on, and criticism of the clinical methods of interviewing". Ash (1949) showed that diagnostic agreement may only be reached on 30-40 per cent. of occasions by psychiatrists working under controlled conditions. These criticisms, if accepted, are a further blow to the prestige of type psychology.

The case against type psychology is therefore strong, and the possibilities of trait psychology and R Technique should certainly be explored and exploited to the full. Nevertheless, the possibility of refining type psychology by introducing exactitude through Q Technique need not be overlooked. This paper is an exploratory operation in this direction; so far as I am aware, no previous effort on a similar scale has been made.

As it happens, the data used in this paper were actually amassed for use in an R Technique study which has already been described (Monro, 1953, 1954). On examination, they proved equally suitable for elaboration by Q Technique. It seemed a pity to miss the opportunity thus presented, so a type analysis was carried out as described below.

In the R Technique works referred to (1953, 1954), a rating scale of 246 traits, based on that evolved by Cattell (1946) was prepared. With the help of linguistic experts, each trait on this list was provided with an operational definition in terms of actual behaviour. A sample of 200 patients was carefully chosen to be as characteristic as possible of the disordered population of the country as a whole. These patients were rated for the presence or absence of

each trait at the time when their illness was at its height. A sample of these patients was rated by two colleagues in conjunction with myself, and inter-correlations between us greater than plus 0.80 were obtained. The ratings on the sample of 200 patients, subjected to this control, formed the starting point of this Q Technique study.

The task was only a degree less formidable than the R Technique studies already referred to. The number of intercorrelations to be tackled was 19,800, so all the labour-saving devices described in detail in the R Technique studies, were re-employed. Ratings were transferred to Powers-Samas punched cards; Thurstone's Diagrams (1933) were used to compute the correlation co-efficients, and all correlations of lesser magnitude than 0.50 were eliminated without computation, with the help of specially constructed tables. The results of rating for each patient were compared with those of every other patient and the tetrachoric correlation co-efficient computed in every case where this exceeded 0.50. A card index was prepared with one card for each patient, on which were entered all his intercorrelations with other patients greater than 0.50. From this card index, a graphic table of correlations was prepared in the usual way, in which the patients were classified in rough groups according to the correlations. These groups were then more carefully sorted out according to the technique evolved in my R Technique studies. Finally, all of less than 0.65 were rejected, as at any lower level there was considerable overlap between groups, and the difficulty in allocating doubtful patients was too great. These latter were placed in the group to which they had the strongest claim by virtue of the number and the size of their correlations with other members of the group. As a result of this work 20 groups and sub-groups were derived, varying in size from 3 to 15 patients. Fifty patients out of the 200 could not be allocated to any group; that is to say, they could not be typed.

Before proceeding further it is essential to show what the technique adopted here can be expected to do, with special reference to its limitations, and its relationships to the clinical approach.

1. It shares with the clinical approach reliance on the principle of classification according to symptoms, a principle considered by Henderson and Gillespie (1952) to be the most fruitful one.

2. This study, by using a comprehensive trait list which covers every aspect of the personality, describes the whole personality of the patient at the height of his disorder. It is less concerned than psychiatry with details of the morbid process, and more concerned with that portion of the patient's personality which remains little changed, or within "normal limits". It must tend, therefore, to yield deviant personality types, rather than the mental diseases or reaction-types described by psychiatry.

3. In this study the emphasis is on pure description. Interpretation is deliberately played down as unsuitable at so early a stage in the exploration of a new technique. The advantage gained is accuracy, but the result is bound to appear somewhat "thin" to a clinician accustomed to the rich interpretative background of the concepts he uses every day.

4. This study is purely cross-sectional. Types based on time-sequence, such as catatonic schizophrenia and the manic-depressive psychosis, can therefore only appear as an incident in one phase of a known multiphasic illness. Involutional melancholia is also unlikely to be recognized as such. This loss is

unfortunate, but does not invalidate those types discovered. The defect is also one which should be capable of being remedied in the future.

Having clarified these issues, one can return to the 20 groups and sub-groups yielded by the data. Each of these, of course, is composed of all the patients belonging to a type or sub-type. To describe the type it is merely necessary to indicate the features common to all the patients in the group. This was done here as follows:

In my previous R Technique studies, a method was evolved for converting the rating on the list of 246 variables into a score on a list of 35 compound traits, derived from the larger list by intercorrelation. By using this method, the rating of each patient in a group was converted into his score on the 35 variables. The average score for the group was then easily obtained for each of these variables.

The Table below shows the average scores or "profiles" for each group on the 35 variables. The letter "v" after a score indicates wide variation between the scores of individual patients in that group, on that variable. The traits composing each of the 35 variables are given in full elsewhere (Monro, 1953, 1954). The operational definition of each trait is also given (Monro, 1953). From the Table below, therefore, it is possible to work backwards from the codified score to the behaviour which gave rise to it, and so to describe the conduct characteristic of each type. After the table, there follows a description of each type, arrived at in this way, but not fully elaborated into terms of actual behaviour, for the sake of brevity.

TABLE SHOWING THE AVERAGE SCORE FOR EACH TYPE ON THE 35 VARIABLES
The variables are shown in the column on the left, the types along the top

	1A	1B	1C	1D	2A	2B	2C	2D	3	4	5	6	7	7x	8	9	10	11	12	13
1	0	0	0	0	3	3	2v	2	0	2	3	0	0	0	0	1	4	2v	0	0
2	0	0	0	0	3	3	2	2	1	2	3	0	0	0	0	2	2v	0	0	0
3	0	0	0	0	2v	2v	1v	2	1	1	2	1	0	0	0	3	3	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	2	0	0	0
5	0	0	0	0	0	0	0	0	1	0	0	4	0	2	0	1	2	0	1	2
6	0	0	0	0	0	0	0	1	1	0	0	3	3	0	0	0	0	0	0	0
7	0	0	4	0	0	0	0	0	2	0	0	4	4	4	0	0	0	1	0	3
8	0	0	0	0	0	0	1	0	1	1	0	3v	1	2	0	0	1v	0	0	1
9	0	0	1	3	0	0	0	0	1v	0	0	4	1	2v	0	0	0	3	1	1
10	0	0	0	1v	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0
11	3	3v	4	2v	0	0	0	0	2	0	0	3	3	2	1	0	0	4	3v	3
12	2v	1	0	3	4	3	4	4	2v	1	0	0	0	1	3	3	1	2v	0	0
13	1v	0	0	3v	3	1v	2v	2v	1	3	1v	0	0	0	0	2v	0	1	0	0
14	0	1v	0	1v	0	0	0	1	2	0	1	3	0	0	1v	1	2	0	1	1
15	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2v	1	0	0
16	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2v	0	0
17	0	0	0	0	0	0	0	0	0	0	0	2v	0	0	1	0	1	3	0	0
18	0	0	0	0	0	0	0	0	0	0	3	0	0	1	0	0	2v	0	0	0
19	1	0	0	0	0	2v	0	0	0	0	0	0	0	0	0	3	3	0	0	0
20	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	3	0	0
21	0	2v	3	0	0	0	0	0	0	0	0	1v	3	3	1v	0	0	0	2	1
22	1v	3	3	1	0	0	0	0	1v	0	0	1	3	3	1	0	0	2	2v	2
23	0	1v	0	0	0	0	0	0	0	0	0	3	2	3	0	0	0	0	1	2v
24	2v	2	3	2v	2v	1	2v	1	2	3	0	1	2	1v	1	0	0	4	2	1
25	1	1	3v	1	0	0	0	0	0	0	0	2v	0	0	0	3v	2	0	2v	3
26	4	2v	0	4	3	2v	2v	1	0	1v	2v	0	0	0	3v	2	0	4	3	2
27	4	3	2v	4	4	2v	3	1	3	4	3	0	0	0	4	0	0	4	3	2
28	3	4	3	4	0	2	0	0	3	0	0	3	0	1	0	3	0	4	2	0
29	1v	3v	1v	1v	1	0	1	3	3	4	3	3	3	3	4	1	0	3v	1	4
30	3	3	0	3	4	3	3	3	3	3	4	0	2v	3	4	3	1	1	2	3
31	3	3v	3	2v	1v	1v	1v	0	1v	1	2v	2	4	3	4	0	0	2	2v	1
32	2v	3	3	3	0	0	1	1v	2v	1	0	0	1	2v	2v	1	0	2	3	3
33	1	2v	1	1	0	0	1	0	0	1	1	3v	2	2	2	0	0	1	3	3
34	2v	3	4	1	0	0	0	0	2v	0	1	1	4	3	2v	0	0	3	4	4
35	1v	1v	0	3	3	2v	3	2	0	1	2v	0	0	0	1	3	2v	0	2v	0

TABLE SHOWING THE COMPOSITION OF THE SAMPLE POPULATION

				Women	Men	Total
Schizophrenia	..	..	..	9	10	19
Manic-Depressive	..	..	..	21	17	38
Paranoid	..	..	..	3	3	6
Involutional	..	..	..	3	1	4
Schizo-Affective	..	..	..	7	5	12
Anxiety States	..	..	..	18	13	31
Hysteria	..	..	..	18	13	31
Neurotic Depression	..	..	..	15	10	25
Obsessionals	..	..	..	3	2	5
Miscellaneous	..	..	..	17	12	29
				114	86	200

DESCRIPTION OF THE TYPES OBTAINED

TYPE 1

This was found to consist of 34 patients. It was composed of four groups showing a substantial amount of overlap. There was no serious question as to which patients belonged to the type, but the four groups presented some difficulty. This was most easily resolved by regarding the type as divided into four sub-types, without claiming that this particular division was the only one possible. It was, however, the one which emerged from the application of the principle enunciated above for dealing with doubtful cases. The four sub-types, 1A, 1B, 1C and 1D contained respectively 15, 9, 5 and 5 cases.

The type as a whole is characterized by a high degree of indifference to others. Those who compose it prefer their own company to that of others; they lack curiosity, tend to be secretive and are generally awkward in their ways and dealings. Their loss of interest also occurs in relation to work, hobbies and spare-time activities, and is accompanied by general under-activity and slowness. They show little sign of enjoying life, have no sense of humour and are seldom seen to laugh. Most are unable to plan realistically for the future, and tend to give up jobs that are within their powers to complete. They are undependable, casual or off-hand in manner and their sentiments do not remain attached to one object for long.

Although there is some variation in this respect, most of the type lack courage and either have no intimate relationships, or fail to show any strong feelings in such relationships. They often complain about their lot, either feeling deprived of something that is their due, or expressing a general sense of grievance against life. Many of them show considerable thought disorder.

There is a definite, but less strong, tendency for this type to be plaintive, self-centred and unable to face uncomfortable truths. They tend to blame others for their own shortcomings and show considerable powers of self-deception. By and large, there is an association between this type and intellectual poverty, shiftlessness, narrow interests and commonplace ways and habits.

It may tentatively be called the Socially Withdrawn Type.

SUB-TYPE 1A

This is quiet, shy, self-effacing, taciturn and reserved. Its members are depressed, pessimistic, and in some cases prone to worry and rumination on painful topics. To a lesser extent they are conventional and inclined to belittle themselves and overvalue others. They tend to defer unduly to others and

distrust their own capacity to undertake activities even when these have been shown to be within their powers. It is worth noting that this sub-type is not hostile or pugnacious, nor is it obstructive or negativistic.

It may provisionally be called the Quiet, Depressed, Self-depreciatory Sub-type.

SUB-TYPE 1B

This, in addition to depression, pessimism, anxiety and pathological rumination, shows strong tendencies to obstructiveness, opposition to others for the sake of opposition, or downright negativism. It is also tactless and lacking in gratitude, while at the same time displaying self-pity, eagerness for attention and an affected manner. There is a less marked, but definite tendency to quiet aggressiveness, suspicion and the use of cutting language, coupled with a jealous, defensive attitude and lack of the capacity for unbiassed thinking. In contrast to 1A, this group is not unduly submissive or self-deprecatory.

It can provisionally be called the Depressed, Negativistic, Mildly Hostile, Self-displaying Sub-type.

SUB-TYPE 1C

In contrast to the other sub-types, this one shows no tendency to depression or anxiety. Its members are notably impulsive, mischievous, reckless, impatient and headstrong. Emotionally they are labile, easy-going and undisturbed by their own shortcomings. They are irresponsible, lacking in conscience and have low moral standards, together with carelessness with possessions and a strong tendency to drift:

Most of them show considerable aggression, suspicion and vituperative power, and are tactless, ungrateful, obstructive or actually negativistic. In addition, they are, almost without exception, unkempt, offensive in habits or person to their social equals, and slipshod in all their ways.

This can provisionally be called the Impulsive, Aggressive, Inadequate Sub-type.

SUB-TYPE 1D

This has, as its most pronounced characteristics, quietness, reserve and shy self-effacement. It is also depressed, pessimistic, anxious and ruminative. In these particulars it closely resembles 1A, and also shares its submissive, self-depreciatory tendencies. In contrast, however, this sub-type is emotionally inhibited and inflexible, as well as being habit-bound. It is also gentle in temper, averse to fighting, low in self-esteem, naïve and lacking in ambition.

It can provisionally be called the Weakly Rigid Sub-type.

By clinical classification, Sub-type 1A contained 9 schizophrenics, 3 depressive psychotics, 2 cases of involutional melancholia and 1 of depersonalization. Of the schizophrenics, 4 were of the simple type, 1 was hebephrenic, 2 had acute schizophrenic reactions, and 2 suffered from schizo-affective states.

Sub-type 1B contained 5 schizophrenics, 1 depressive psychotic, 1 case of paranoia, 1 of depersonalization, and 1 inadequate personality with drug addiction. Of the schizophrenics, 2 were paranoid, 2 were acute reactions and 1 had a schizo-affective psychosis.

Sub-type 1C contained 1 catatonic schizophrenic (in the overactive phase), 2 acute schizophrenic reactions, 1 schizo-affective state and one immature personality of the aggressive type.

Sub-type 1D contained 1 simple schizophrenic, 1 depressive psychotic, 1 schizo-affective state, 1 schizoid personality with depersonalization and 1 hysteric.

It is clear that neither the type nor its sub-types correspond exactly to the clinical categories in normal use. The kind of patients described by the type and sub-types can, however, be readily recognized in the wards of any mental hospital. In contemplating the findings set out above, one is irresistibly reminded of the concept of regression, and it may be that this type is really describing the regressed patient, irrespective of the particular psychotic state which has heralded his regression.

TYPE 2

This was found to consist of 35 patients, and presented a similar structure to Type 1, having 4 sub-types which overlapped to a considerable degree, and contained respectively 11, 9, 10 and 5 patients.

The type as a whole shows, as its main component, self-dissatisfaction and self-distrust, with undue submissiveness towards others and rather slavish adherence to the conventions. Nearly as prominent are depression, pessimism, anxiety and rumination, coupled with inhibited, inflexible emotionality and habit-bound tendencies.

Most members of the type are conscientious, responsible, painstaking, reliable and persevering. They have a high sense of personal honour and a serious cast of mind. They tend to be deliberate in their ways, rather formal, and also thrifty. They like to consider pro's and con's before expressing judgments or coming to decisions. They are honest, patient, loyal and kind. They do not easily become resentful, and many are given to self-denial. One can expect them, as a rule, to be reasonable and co-operative, and to display good manners.

The type as a whole can provisionally be regarded as portraying Anxious Depression of the Self-depreciatory, Rigid and Conscientious Type. The sub-types are described below, but they are less well differentiated from the type and from each other than in Type 1.

SUB-TYPE 2A

This group show, as their chief characteristics, lowering of activity, blunting of interest, retardation and loss of the sense of humour. To an almost equal degree they are reserved, quiet, shy and self-effacing. Most of them dislike strife, and are difficult to rouse to anger. They tend to be humble, tolerant of the ways and attitudes of others, and perhaps unduly trustful. Some are naïve and lacking in ordinary ambition.

This can provisionally be called the Inert, Reserved and Gentle Sub-type.

SUB-TYPE 2B

This group is the least well differentiated from the type. It shows less gentle peaceableness than any other sub-type, and is more free than any other from tendencies to self-pity, affectation of manner and self-advertisement. In a more positive sense, it is distinguished by the presence of religious interests and the active practice of religious disciplines. It shares with sub-type 2A some degree of inertia and reserve.

It can provisionally be called the Puritanical Religious Sub-type.

SUB-TYPE 2C

Here again one meets the inertia and some of the reserve and rather simple gentleness of 2A. This group, however, tends to be indifferent to others, and to prefer its own company to that of others. Its members are usually secretive,

lacking in curiosity, and awkward in their habits. There is a definite association here with low intelligence, narrow interests, banality and shiftlessness.

This can provisionally be called the Inert, Aloof and Inadequate Sub-type.

SUB-TYPE 2D

This group is particularly characterized by self-pity, eagerness for attention and an affected manner. Many of its members are fastidious, faddy, pernickety or pedantic. There is an echo of the somewhat simple gentleness of other sub-types, but rather a faint one. Of all the sub-types, too, this one shows the least degree of inertia and reserve.

It can provisionally be called the Importunate, Affected, Fastidious Sub-type.

By clinical categories, Sub-type 2A contains 4 depressive psychotics, 4 neurotic depressions, 2 anxiety states and 1 schizo-affective case.

Sub-type 2B contains 3 depressive psychotics, 3 anxiety states, 2 neurotic depressions and 1 involutional depression.

Sub-type 2C contains 4 depressive psychotics, 3 neurotic depressions, 2 anxiety states and 1 obsessional neurotic.

Sub-type 2D contains 4 anxiety states and 1 neurotic depression.

Like Type 1, Type 2 does not correspond exactly to any clinical category. It and its sub-types, however, are frequently encountered in psychiatric practice, and this type probably represents simply the largest single group of anxious depressions.

TYPE 3

This shows the usual depressive group of traits, with much inertia. There is also affectation, eagerness for attention and much self-pity. To a lesser extent, its members show impulsive, impatient tendencies, with changeable emotions and general lack of forethought. They are fickle in their attachments, casual in manner and apt to be undependable. Many are of low intelligence, shiftless habits and narrow interests. To a variable extent they are dissatisfied with themselves and the world, and given to undue complaining. They tend to blame others for the results of their own weakness and dislike uncomfortable truths. On the whole, they are self-centred and prone to self-deception.

The type contains 14 patients, with no division into sub-types. Clinically it contains 7 cases of neurotic depression, 5 hysterics, 1 depressive psychotic and 1 depersonalization. It approximates more closely to clinical categories than the two former types, being easily recognizable as "Depression with Hysterical Features" or "Depression occurring in a Hysterical Personality".

It can provisionally be called the Labile and Plaintive Type of Anxious Depression.

TYPE 4

This was found to contain 3 patients. It has many points of resemblance to Type 3, especially in being inert, depressed and fond of attracting attention. Its right to existence as a separate type was therefore considered with extreme care, but the verdict against its inclusion in Type 3 was absolutely clear. This type is much more clearly linked to low intelligence, and is socially withdrawn, aloof, indifferent to others and secretive. It is naïve, unduly trustful, and dislikes fighting and violence. To a lesser, but definite extent, it is conscientious, pains-

taking and persevering, honest, loyal, kindly and difficult to arouse to resentment.

Clinically, it contains 2 hysterics and 1 depersonalization syndrome. The hysterical traits, along with depression, appear in the type, which nevertheless resembles nothing so much as a well-trained defective. Indeed, this type probably represents the kind of depressive flurry with hysterical features which is so common in the intellectually backward. The morbid reaction is similar to that picked out by Type 3, but the kind of personality in which it occurs is different.

It can provisionally be called the Socialized Backward or Defective Personality Type with Depression.

TYPE 5

This was found to contain 6 patients. It shares with the previous two types their anxious depression, inertia and self-pitying love of attention. There, however, the resemblance ends. This type is fastidious, faddy, pernickety and pedantic. It has strong religious interests and is usually idealistic and humanitarian in outlook. Its members are conscientious, reliable, responsible, pains-taking and persevering, as well as being patient, loyal, honest, self-denying and kind. For the most part they are friendly, well-mannered and co-operative, and many have some artistic talent. They tend to be imaginative, musical and interested in the arts.

Although there is some variation in the following particular, this type tends to be drawn from the ranks of the socially expert, versatile people of wide interests, who are often found in positions of relative leadership.

Clinically this type contains 3 depressive psychotics, 1 schizo-affective state, 1 anxiety state, and 1 inadequate personality.

Provisionally it can be called the Fastidious, Conscientious, Imaginative and Cultured Type of Anxious Depression.

TYPE 6

This was found to contain 5 patients, all of whom were clinically diagnosed as mania. The resemblance to the textbook description of mania is so strong that further elaboration here is unnecessary.

TYPE 7

This was found to contain 5 patients. They display marked thought disorder, with mischievous impulsiveness, evasiveness and extra-punitive tendencies. They are talkative, boastful, accelerated, intrusive and intemperate in their display of emotion. They are also casual, fickle, and undependable and lack the power to plan or to sustain effort. In addition, they are suspicious, bad-tempered, aggressive and abusive, and inclined to be obstructive or negativistic. Most of them are manneristic and given to self-display, while also unkempt, slipshod and so deteriorated in manners or habits as to give offence to their social equals. The majority show marked jealous tendencies, take offence where none is intended, and show distortion of their thought by prejudice or firmly held misconceptions.

Clinically it contains 4 schizo-affective cases and 1 acute schizophrenic reaction. If one accepts the fact that the line of demarcation between these two entities is not clear, and grows less clear if the diagnosis is made early in the history of the case, it seems that here the type corresponds very closely to the clinical category of the acute schizophrenic episode, and it can therefore be called the Acute Schizophrenic Type.

TYPE 7x

This type does not conform to the criteria laid down for the formation of a type, but comprises an odd group of patients, 5 in number, whom it is difficult to classify. Each one, taken alone, has sufficient correlations with Type 7 for admission to that type, but has no correlations at the chosen level of 0.65 with others in Type 7x. The choice lies, therefore, between including one or two of Type 7x in Type 7 in a somewhat arbitrary way, or leaving the group as a loose appendage to Type 7. I have chosen the latter alternative.

As one would expect, this type shows a lower internal consistency than most. Its most prominent feature is impulsive, mischievous recklessness, allied to impatience and emotional lability. It is also talkative, boastful, intrusive, accelerated and emotionally uninhibited. The patients composing the type are also aggressive, suspicious and abusive, obstructive or negativistic, and assertive, argumentative and conceited. In addition to thought disorder there is definite depression, together with the self-display, evasiveness and extra-punitive tendencies shown by Type 7.

The variations shown by this group are, as already indicated, considerable. Some are gregarious and frivolous, others amorous, erotic and sensual, while some show something of the hard, acquisitive, ruthless and dishonest qualities of the psychopath. Others again are fickle and undependable, or jealous, defensive and partial. Finally one may note lax irresponsibility and dissatisfied aloofness from emotional entanglement. Various combinations of these various traits are also to be found.

Clinically this group contains 3 depressive psychotics, 1 neurotic depression and 1 psychopath with anti-social tendencies. It would be unwise to try and christen this group, which appears to belong to the as yet uncharted no-man's-land between acute affective and schizophrenic disorders.

TYPE 8

This was found to contain 3 patients, who show most strongly the whole depressive group of traits with inertia, underactivity, thought disorder and eagerness for attention. They are aloof, secretive and indifferent to their fellows, and show marked self-distrust and self-dissatisfaction. They are also jealous, easily offended, opinionated and partial, with a tendency to evade the point at issue, to blame others for the results of their own shortcomings, and to make all kinds of unfounded complaints.

Clinically the type contains two cases of neurotic and one of psychotic depression. It can provisionally be called the Depressed Type with Paranoid Features.

TYPE 9

This was found to contain 7 patients. Their outstanding qualities are conscientiousness, reliability, responsibility and readiness to take pains. They are also persevering, self-respecting, cautious and serious-minded. To a slightly lesser extent they are friendly, frank and affectionate. Their manners are good, they are pleasant to work with and reasonable in their dealings. They show the depressive group of traits, coupled with self-dissatisfaction, self-distrust and undue deference to others. They tend to be habit-bound, and emotionally both inhibited and inflexible, but intellectually their minds are clear, logical and alert. Self-control is characteristic of the group, along with patience, loyalty, kindness, but also some pernickety or pedantic trends. Most of them are able, intelligent and interested in the things of the mind, though inclined to be

reserved and quiet. To a variable extent, this group shows gentleness, imaginative and artistic ability, and an interest in religion.

Clinically, the type contains 3 anxiety states, 2 obsessional neurotics, 1 neurotic depression and 1 depersonalization. It may be provisionally called the Intellectual, but Overconscientious, Repressive and Rigid Type of Depressive Personality.

TYPE 10

This was found to contain 10 patients, who showed anxiety virtually free from any admixture of depression. In other respects, the members of this group are co-operative, reasonable, friendly and well-mannered, as well as having an alert, clear and logical mentality. They are sociable, versatile and self-controlled, as well as having wide interests, and are often to be found in positions of relative prominence and responsibility.

Most of them are conscientious, reliable and persevering, and combine these qualities with cheerfulness, optimism, geniality, drive and a sense of humour. They like the company of their fellows, are full of curiosity and can adapt themselves easily to the ways of all sorts of people. They show considerable patience, enterprising realism, intelligence and all round ability, but also a certain tendency to inflexibility and inhibition as regards their emotional reactions.

Clinically, the type contains 7 anxiety states, 1 hysteric, 1 phobic reaction, and 1 obsessive-compulsive state. Allowing for the difficulty in drawing the line between a pure anxiety state and an "anxiety hysteric", this type is in close accord with clinical classification. It can provisionally be called the Anxious, Capable, Extraverted Type.

TYPE 11

This was found to contain 9 patients. They are casual, fickle, undependable, and lacking in the power to sustain effort or to plan realistically. They are unintelligent, commonplace, shiftless and narrow in their interests. They are profoundly inert and retarded, and also secretive, awkward, and coldly indifferent to their fellows. They are irresponsible, largely devoid of conscience and satisfied with very low standards of conduct and achievement. Most of them are self-pitying and eager for attention, but also evasive, self-deceiving, and inclined to blame others for all their troubles.

To a lesser, but definite extent, they are tactless, lacking in gratitude, and inclined to oppose others for the sake of opposition. They are careless of their appearance and socially withdrawn, and in some cases show a considerable degree of thought disorder. Some are lacking in self-esteem and others are shy, quiet and reserved.

Clinically, the type contains 5 hysterics, 1 simple schizophrenic, 1 anxiety state, 1 true neurasthenic and 1 inadequate personality. It appears to correspond to the category of dull, backward and inadequate individuals, with whom clinicians are only too familiar. It can provisionally be called the Dull, Shiftless, Irresponsible, Unstable Type.

TYPE 12

This was found to contain 6 patients. They are self-centred and continually complaining. They freely blame others while rejecting all criticism of themselves. They cannot face unpalatable truths and show great powers of self-deception. They tend to be quiet, reserved and self-effacing, and lack a sense of humour.

On the whole they are underactive, defectively interested in their surroundings and slow in their reactions. They are dissatisfied with their lot and lack courage. They do not show strong feelings even in those relationships where one would expect to find them, or they avoid anything in the nature of an intimate relationship. Nevertheless they are quick to jealousy and see offence where none is meant. Their thought is distorted by prejudice and preconception, and they cling obstinately to their ideas in a manner which is quite impervious to logic. They are suspicious, hostile and irritable and have cutting tongues. As a rule they are coldly aloof, withdrawn and indifferent to their fellows, as well as being awkward to deal with, tactless, ungrateful and obstructive. Most of them are habit-bound, inflexible and emotionally inhibited. Some show considerable thought disorder and some are depressed, anxious and inclined to rumination.

Clinically it contains 3 paranoid psychotics, 1 paranoid schizophrenic and 2 anxiety states. It appears to describe the paranoid personality or constitution. It could, perhaps, be called the Suspicious, Extrapunitive, Withdrawn and Rigid Type.

TYPE 13

This was found to consist of 8 patients, who are affected, eager for attention, egotistical, self-pitying and self-deceiving. They are also evasive, plaintive and extrapunitive. They are impulsive, impatient, reckless and emotionally labile, and also casual, fickle and undependable. They have little power of sustained effort, are generally dissatisfied with their lot and lack ordinary courage. They tend to be jealous and to find offence where none is intended, while also being opinionated and prejudiced in their thinking. There is also a considerable tendency to depression and anxiety. Most of the type show marked inertia and slowness. Some are gregarious, adaptable and curious about their fellows in a rather superficial sort of way, while others tend rather to be conceited, assertive, argumentative and sarcastic. The latter tend also to be obstructive, tactless and lacking in gratitude.

Clinically, it contains 5 hysterics and 3 neurotic depressions. It would appear to describe the hysterical personality, but could provisionally be entitled the Self-displaying, Labile, Undependable and Touchy personality type.

DISCUSSION

It is encouraging that this pioneer exploratory effort to use Q Technique with precision in the psychiatric field should yield 13 types of quite a high degree of specificity. Allowing for the absence of organic cases and those in which the time-sequence factor is vital, this result is a satisfactory start to the task of type classification. The following additional points are worth emphasizing.

1. As expected, these types do not correspond exactly to clinical categories. They do, however, describe the kind of patient the clinician is always encountering. The clinical approach and Q Technique are, in fact, describing the same phenomena in different terms. Their results are related in the same way as the physical and political maps of a region. The outline and principal features are the same, but the lines of division differ, because drawn according to different principles.

2. It is interesting that Q Technique and the clinical approach should yield identical pictures in the acute, florid conditions such as mania and the acute schizophrenic reaction, but show more divergence in describing a slow and insidious personality distortion such as paranoia. This is due to the clinical approach being interested in the morbid reaction, whereas Q Technique

describes the whole personality. Where the morbid reaction is florid and virtually replaces the ordinary personality, both techniques yield the same result. In the case of the slow, insidious change, Q Technique picks out the basic personality type, while relatively ignoring the morbid process. In the paranoid type, two anxiety states in patients of paranoid temperament are placed in this type by Q Technique. This phenomenon suggests the possibility of great but controllable flexibility in the use of Q Technique by varied methods of sampling and careful choice in the use of variables.

3. The results pose a number of questions regarding the differentiation of the depressive and the schizophrenic reaction, which is by no means precise by Q Technique. There appear to be three main possibilities to account for this:

- (a) The technique is faulty and unduly insensitive in this respect, probably due to the framing of the "Operational definitions".
- (b) The differentiation between the two reactions is, in actual fact, less clear than one has come to think.
- (c) While the differentiation may be clear in the profoundly affected or advanced case, it is less obvious in the early stage at which treatment should be undertaken. If this is so, new criteria of differentiation probably require to be formulated.

All these possibilities are worth further study.

4. The most significant finding may prove to be the fact that 25 per cent. of the sample could not be typed. A higher proportion could have been included if the level of correlation for admission to a group had been lowered. This, however, would have decreased the specificity of the types to a point at which their value would largely have disappeared. It must also be emphasized that the patients successfully typed were, in the main, the more serious cases; virtually all the schizophrenics, paranoids and depressive psychotics were included, while a substantial proportion of anxiety states, hysterics and the like, eluded typing.

This particular Q Technique study has therefore made little positive, direct contribution to the problem of classifying early and mild cases. It also raises the strong suspicion that Q Technique and type psychology are not the methods of choice for that purpose. It may well be that the case that can readily be typed is past the optimal stage for treatment. This question cannot be settled without further study, but these results incline me to the view that for some time to come, R Technique is the method to use for large scale studies dealing with broad perspectives. The useful place for Q Technique is probably in relation to more circumscribed problems, such, for example, as the classification of inadequate personalities.

SUMMARY

The need is discussed for new descriptive techniques capable of being used in the evaluation of modern methods of treatment. An exploratory effort in this direction is described, in which a sample of 200 patients was investigated by Q Technique and classified into types. The possibilities and limitations of the method used are discussed and the 20 types and sub-types obtained are set out in considerable detail. Provisional titles are suggested as follows:

Type 1. The Socially Withdrawn Type (or the Regressed Type).

Sub-type 1A. The Quiet, Depressed, Self-depreciatory sub-type.

Sub-type 1B. The Depressed, Negativistic, Mildly Hostile, Self-displaying sub-type.

Sub-type 1C. The Impulsive, Aggressive, Inadequate Sub-type.

Sub-type 1D. The Weakly Rigid Sub-type.

Type 2. The Self-depreciatory, Rigid and Conscientious Type of Anxious Depression.

Sub-type 2A. The Inert, Reserved and Gentle Sub-type.

- Sub-type 2b. The Puritanical, Religious Sub-type.
 Sub-type 2c. The Inert, Aloof, Inadequate Sub-type.
 Sub-type 2d. The Importunate, Affected, Fastidious Sub-type.
 Type 3. The Labile, Plaintive Type of Anxious Depression or Depression with Hysterical Features.
 Type 4. The Socialized Backward or Defective Personality Type with Depression.
 Type 5. The Fastidious, Conscientious, Imaginative, Cultured Type of Anxious Depression.
 Type 6. The Manic Type.
 Type 7. The Acute Schizophrenic Type.
 Type 7x. An unnamed type related to the Acute Schizophrenic.
 Type 8. The Paranoid Depressed Type.
 Type 9. The Intellectual, but Over-conscientious, Repressive and Rigid Type of Depressive Personality.
 Type 10. The Anxious, Capable, Extraverted Type.
 Type 11. The Dull, Shiftless, Irresponsible, Unstable Type, which is probably the Inadequate Psychopath.
 Type 12. The Paranoid Personality Type.
 Type 13. The Hysterical Personality Type.

REFERENCES

- ASH, P., "The Reliability of Psychiatric Diagnosis", *J. Abnorm. Soc. Psychol.*, 1949, **44**, 272.
 CATTELL, R. B., *The Description and Measurement of Personality*, 1946. London, G. G. Harrap.
 CHESIRE, L., SAFFIR, M., and THURSTONE, L. L., *Computing Diagrams for the Tetrachoric Correlation Co-efficient*, 1933. Chicago, The University of Chicago Bookstore.
 EYSENCK, H. J., *The Scientific Study of Personality*, 1952. London, Routledge and Kegan Paul.
 HENDERSON, D. K., and GILLESPIE, R. G., *A Text Book of Psychiatry*, 1952. 8th ed. London, Oxford University Press.
 JUNG, C. G., *Psychological Types*, 1923. New York, Harcourt, Brace.
 KRAEPELIN, E., *Psychiatrie*, 1913. 8th ed. Leipzig, Barth.
 KRETSCHMER, E., *Körperbau und Charakter*, 1921. Berlin, Springer.
 MONRO, A. B., "Electronarcosis in the Treatment of Schizophrenia", *J. Ment. Sci.*, 1950, **96**, 254.
 Idem, *A Study of the Correlation Clusters Obtained With a Sample Population of 200 Mentally Disordered Patients*, Ph.D. Thesis, 1953. University of Edinburgh Library.
 Idem, "A Rating Scale Developed for Use in Clinical Psychiatric Investigations", *J. Ment. Sci.*, 1954, **100**, 657.
 "Insulin Shock Therapy", Study by the Temporary Commission on State Hospital Problems: New York (1944), pp. 17 *et seq.*
 SHELDON, W. H., and STEVENS, S. S., *The Varieties of Temperament*, 1942. New York, Harper.
 STEPHENSON, W., "The Inverted Factor Technique", *Brit. J. Psychol.*, 1936, **26**, 344.
 Idem, "Some Observations on Q Technique", *Psychol. Bull.*, 1952, **49**, 43.

SHIFTING OF SET AND GOAL ORIENTATION IN SCHIZOPHRENIA*

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ONE of the important schizophrenic symptoms listed by Bleuler (1950) is a disturbance in attention. Bleuler viewed the attention disturbance as a complex phenomenon which was also related to disturbances in thinking and affect, and possibly to individual emotional complexes.

Writers on schizophrenia have inferred a disturbance in attention from many kinds of behaviour in a variety of situations. A very early psychometric study emphasizing attention disturbances was that of Gatewood (1909), who described the fundamental schizophrenic defect as a "loss of thought control". Malamud and Palmer (1938) used a similar term, loss of "directional control of thought". Kendig and Richmond reported that "the pattern of responses which distinguishes the dementia praecox from 'normal' groups is characterized by marked failure in tests requiring the exercise of close attention and effort" (1940: pp. 73-4). Goldstein considered a loss of the "abstract attitude" characteristic of many schizophrenic patients; this included an inability "to assume a mental set voluntarily", "to shift voluntarily from one aspect of the situation to another", or "to keep in mind, simultaneously, various aspects" of the same situation (1943: p. 263).

"Attention" or "mental set" in schizophrenia has also been investigated by reaction time techniques. At long preparatory intervals schizophrenic patients do not respond differentially to regular and irregular procedures, as do normal subjects (Huston, Shakow and Riggs, 1937; Rodnick and Shakow, 1940; Huston and Singer, 1945; Huston and Senf, 1952). Set indices based on such data differentiated well between schizophrenic and non-schizophrenic subjects (Rodnick and Shakow, 1940; Huston and Senf, 1952). Shakow (1946) concluded that schizophrenic patients seem unable to keep an effective mental set for longer than a few seconds.

As part of a larger study of schizophrenic psychopathology (Huston and Senf, 1952; Cohen, Senf and Huston, 1954; Senf, Huston and Cohen, in press),

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the tests reported here were constructed to measure two aspects of attention or mental set, to be referred to as shifting of set and maintenance of goal orientation. Each test contained a basal condition, and a second condition which emphasized the aspect either of shifting set or of maintaining goal orientation. If schizophrenic patients have a specific difficulty in shifting set, or in maintaining orientation toward a goal, then the difference between scores on the second and first conditions of each test should be greater for schizophrenic than for non-schizophrenic subjects. The tests were given without and with drugs, intravenous sodium amytal and amphetamine sulphate. These drugs improve some schizophrenic patients clinically (Gottlieb, Bobbitt, and Freidinger, 1952), thus making it possible to study them in an altered state. If the drugs improve schizophrenic patients' ability to shift set or to maintain goal orientation, then these scores should improve.

SUBJECTS

The subjects included 24 chronic schizophrenic (CS), 22 early schizophrenic (ES), 21 manic-depressive, depressive type (Dp), and 21 neurotic (Nt). The mean age of the CS patients was 39 years, ES 26, Dp 37, and Nt 30. The mean educational level in each group was 12 years. The mean duration of illness was: CS 12 years (minimum, 4 years); ES 1 year (maximum, 3 years); Dp 9 months; and Nt 6 years. Further description of the subjects is given in Cohen, Senf and Huston (1954).

TESTS

The test of shifting of set had two conditions, Non-shift and Shift. The Non-shift condition contained three separate parts of 21 problems each, in addition, subtraction, and multiplication, given in that order. The subject was instructed before each part to work as rapidly as possible. The problems were very simple, using only single digits; for example, $7+6$, $9-4$, 5×7 . In the Shift condition the same problems were repeated with the addition, subtraction, and multiplication problems mixed in random order. The total of 63 problems was given in units of 21 each, the same length as the units in the Non-shift condition. Time and errors were recorded.

To study goal orientation there were two conditions, simple addition ("Non-distraction") and addition with a distraction ("Distraction"). In the Non-distraction condition the subject was given five different problems of 15 single digits arranged in a column to add as rapidly and as accurately as possible. He was required to add out loud as he proceeded from digit to digit. This made possible the recording of time and errors in the process of addition. The Distraction condition consisted of the same five problems, but with the additional task of checking each number in the column where the partial sum ended in a digit specified below the column to be added. If, for example, the encircled number below a column was a five, then if correctly added four partial sums ended in five, and thus four numbers were to be checked. Checking the digits is a distraction which tends to draw attention away from adding the numbers quickly and correctly.

PROCEDURE

The tests of shifting of set and goal orientation were given on the same day. After an average interval of seven days different forms of these tests were given under drugs. In the same syringe 0.5 gm. of sodium amytal and 20 mgm. of amphetamine sulphate were mixed in 10 c.cm. of sterile water and injected at the

rate of 1 c.cm. a minute, until they produced slight nystagmus on lateral gaze. The average amount was 0.3 gm. of sodium amytal and 13 mgm. of amphetamine sulphate.

On both tests each patient's co-operation was rated on a scale (Huston and Senf, 1952) from A to E. Those whose co-operation rating was below C—either without or with drugs were not included in the statistical analysis. The numbers of subjects on which the results are based are: for the test of shifting of set, CS 23, ES 19, Dp 20, Nt 21; and for the goal orientation test, CS 22, ES 20, Dp 21, Nt 21. Co-operation ratings from C— to A+ were scored 1 to 9 for use in correlations.

The analyses of variance were based on log time and log error scores. The difference scores, Shift minus Non-shift, and Distraction minus Non-distraction, will be of primary interest. They will be referred to as Shift Time and Error Increments, and Distraction Time and Error Increments.

RESULTS

Shifting of Set

Without drugs, as was expected, the Shift condition was more difficult than Non-shift (Table I); both the Time and Error Increments were significantly

TABLE I
Shifts in Set by Diagnostic Groups Without and With Drugs

	Time in Seconds				Errors			
	Non-shift		Shift		Non-drug		Shift	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
CS	116.1	46.0	170.2	81.7	2.7	3.0	3.6	3.5
ES	78.9	30.1	108.5	40.9	1.5	1.8	3.4	2.6
Dp	90.8	29.8	132.8	52.0	1.0	1.3	1.7	1.7
Nt	71.7	15.2	98.6	28.6	1.2	1.0	2.1	2.1
Drug								
CS	126.3	59.4	173.6	78.4	2.7	2.4	5.5	5.2
ES	77.8	22.0	111.8	42.3	2.8	3.0	4.3	4.7
Dp	91.4	28.8	120.7	36.0	2.7	2.7	3.0	3.0
Nt	72.8	20.3	99.9	29.6	1.5	1.5	2.5	2.1

greater than zero ($P < .001$ in both cases). However, the introduction of the requirement of shifting had no differential effect among the groups on either time or error scores. On the drug test the Increments were again significantly greater than zero (Time, $P < .001$; Error, $P < .01$), and again did not differ among the groups. Neither did the drugs have any significant effect on the magnitude of the Increments.

With the Non-shift and Shift scores considered together, without drugs the groups differed significantly in speed ($P < .001$) and in accuracy ($P < .05$). The CS group was significantly slower than the other three groups (CS vs. ES and CS vs. Nt, $P < .001$; CS vs. Dp, $P < .05$) and made significantly more errors than the Dp group ($P < .01$), which had the fewest errors. The Dp group was significantly slower than the Nt ($P < .05$). No other pairs of groups differed significantly.

On both conditions the groups tended to be slightly but not significantly slower with drugs than without; and made more errors ($P < .001$). The Dp group was an exception in that this group speeded on the Shift condition; also, the increases in errors were largest for this group.

Goal Orientation

Without drugs the Distraction condition proved more difficult than Non-distraction (Table II). For all groups the Time and Error Increments were

TABLE II

Maintenance of Goal Orientation by Diagnostic Groups Without and With Drugs

	Time in Seconds				Errors			
	Non-distraction		Distraction		Non-drug		Drug	
					Non-distraction	Distraction	Non-distraction	Distraction
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
CS	167.3	86.1	195.1	75.6	4.0	5.7	3.8	2.8
ES	134.3	92.7	151.3	73.0	2.4	2.5	2.8	3.4
Dp	149.7	93.3	204.9	141.8	2.0	2.8	1.7	1.8
Nt	114.7	34.5	152.5	42.1	1.6	1.6	2.9	2.6
CS	152.5	51.5	201.6	85.1	3.5	3.5	4.4	4.3
ES	120.7	61.3	153.1	79.5	3.1	3.3	3.7	3.0
Dp	123.8	65.5	157.3	77.0	2.2	1.5	1.9	1.8
Nt	107.3	28.1	135.9	37.9	2.5	1.7	2.9	2.3

significantly greater than zero (Time, $P < .001$; Error, $P < .05$). The Time Increments differed among the groups ($P < .01$), being smaller in the schizophrenic than in the non-schizophrenic groups. The groups did not differ significantly in Error Increment. On the drug test only the Time Increment was significantly greater than zero ($P < .001$). Also, it did not now differ among the groups; the Time Increment in the schizophrenic groups increased, becoming as large as that in the non-schizophrenic groups.

With respect to levels of performance, without drugs the CS patients were slowest and made the most errors. However, group differences in speed were not significant on either condition. With both conditions considered together, the group error scores differed significantly ($P < .05$). The only pair of groups between which the difference reached significance was the CS and Dp ($P < .01$). With drugs, on both conditions there was a general tendency for the groups to be faster and less accurate than without drugs. The schizophrenic groups speeded somewhat on Non-distraction. The speeding was more marked in the non-schizophrenic groups, particularly in the Dp group. The increase in errors was also greater in the non-schizophrenic groups, especially on the Non-distraction condition.

Correlations

Since the relations between the test scores and certain other variables may

TABLE III

Correlations, for All Groups Combined, Between Non-drug Time Scores and Other Variables

	Non-shift	Non-distraction
Co-operation	— .380*	— .297*
Wechsler Short Form I.Q.	— .525*	— .309*
Duration of Illness	+ .388*	+ .151
Age	+ .247†	+ .022

* Significantly different from zero at the 1 per cent. level.

† Five per cent. level.

be of interest, selected correlations are given in Table III. In general, no one of the variables of co-operation, IQ, duration of illness, or age was highly associated with the time scores.

DISCUSSION

The general plan of these studies was to identify more accurately the characteristics of schizophrenic thinking and to observe alterations produced by the drugs.

In this study the tests used arithmetic operations which were simple and familiar, so that the shifting of set and maintenance of goal orientation would stand out clearly as the principal variables. As was intended, the Shift and Distraction conditions were in general more difficult than the basal conditions.

Without drugs the added requirements of the Shift over the Nonshift condition did not produce any greater deficit in the schizophrenic groups than in the non-schizophrenic. Neither did the requirements of the Distraction over the Non-distraction condition. This evidence suggests that schizophrenic patients are unimpaired in ability to shift set and to maintain goal orientation. Such a conclusion may apply only to the particular kind of task used here. Schizophrenic patients have been reported to do relatively well on arithmetic tasks (Hunt, 1935; Malamud and Palmer, 1938; Rabin, 1941; Magaret, 1942). On the other hand, there is evidence that schizophrenic deficit appears when the task involves personal-social material (Malamud and Palmer, 1938; Whiteman, 1954). In a study (Senf, Huston and Cohen, in press) on the same groups used here, the patients completed sentence stems, some of which had no specific personal reference (Impersonal), while others did (Personal). The Personal Discrepancy, the difference between scores on Impersonal and Personal items, was zero in the non-schizophrenic groups, but greater than zero in the schizophrenic groups. That is, the schizophrenic patients were poorer on the Personal items. It is unlikely that simple arithmetic problems would arouse idiosyncratic affective meanings to any influential extent (Squires, 1936). It seems plausible that schizophrenic disturbances in maintaining goal ideas and in shifting appropriately from one "set" to another do not represent a formal alteration in some basic thinking process, but, instead, depend on the interfering effects of personal themes. Experiments on shifting of set and goal orientation, patterned after the present study but including personally meaningful material, would clarify this problem.

Another variable tentatively identified as relevant to schizophrenic deficit was the degree of task structure (Senf, Huston and Cohen, in press). The suggested relation was that schizophrenic patients would show greater deficit on unstructured than on structured tasks. In the present experiment the arithmetic problems presented a simple, well structured stimulus situation with the possibility of only one response. Schizophrenic patients may be more able to maintain goal orientation and shift set appropriately under highly structured test conditions than under less structured ones (Rickers-Ovsiankina, 1937). This hypothesis could be studied with tests varying the degree of task structure.

The drugs did not produce an improvement in ability to shift set or to maintain goal orientation. Since without drugs there was no deficit in the schizophrenic groups, there would be no reason to expect improvement with drugs.

Only on the Distraction Time Increment were the schizophrenic groups affected differently than the non-schizophrenic groups by the drugs. Without drugs the Distraction Time Increment was *smaller* in the schizophrenic than in the non-schizophrenic groups. With drugs this Increment increased in the

schizophrenic groups, mainly due to speeding on the Non-distraction condition, so that it no longer differed from that in the non-schizophrenic groups. These findings resemble those on reaction time in the same groups (Huston and Senf, 1952). Without drugs at the ten second preparatory interval the schizophrenic groups, particularly the CS group, had a smaller difference between reaction times to regular and irregular procedures than the non-schizophrenic groups. With drugs this difference was as large as that in the other groups. The Non-distraction condition and regular procedure are easier than the Distraction condition and irregular procedure. This suggests a relation between the difficulty of the task and the effect of the drugs on schizophrenic subjects.

The Personal Discrepancy referred to earlier was abolished when these schizophrenic patients were given the drugs (Senf, Huston and Cohen, in press). The drugs appeared to eliminate the interfering effects of the personal reference. It might be expected, therefore, that in an experiment which introduced personal affective meaning into a study of goal orientation and shifting of set, differences between schizophrenic and non-schizophrenic groups would be decreased by the drugs.

In non-drug level of performance, on both tests the CS group in general was slower and made more errors than the other groups. This is consistent with the other studies in this series. With drugs there was a general increase in errors on both tests for all groups. This trend conforms with previous observations of the deleterious effects of the drugs on accuracy under highly structured task conditions requiring high precision of response (Senf, Huston and Cohen, in press). The groups were slightly slower with drugs on the shifting of set test and tended to be faster on the goal orientation test.

The Dp group was the only one to speed on the Shift condition, and speeded most on both the Non-distraction and Distraction conditions. This is also consistent with the other studies in this series where the drugs speeded the Dp group most and the schizophrenic groups least or not at all. The same rank order was noted for the modifiability of thinking by the drugs in these same groups (Cohen, Senf and Huston, 1954). The differential effects of these drugs on the diagnostic groups raise problems of fundamental physiologic interest (Meadow, Greenblatt, Funkenstein and Solomon, 1953).

SUMMARY AND CONCLUSIONS

To study shifting of set and maintenance of goal orientation, two tests using simple arithmetic problems were constructed. These were given to four groups of patients (chronic schizophrenic, early schizophrenic, depressive, and neurotic) without and with drugs (sodium amylal and amphetamine sulphate). These drugs were used because they alter the mental state of some schizophrenic patients.

Though the chronic schizophrenic patients in general performed at a lower level than the other groups, the results did not reveal any special deficit in ability to shift set or to maintain goal orientation in either schizophrenic group. It is suggested that this may be due to the particular kind of task used here, and that when schizophrenic patients appear to have difficulty in shifting set and maintaining goal orientation, this is the result of the interfering effects of personal or affective preoccupations. The speeding of responses in the depressive group may point to a fundamental physiologic difference between the depressive and schizophrenic psychoses.

REFERENCES

- BLEULER, E., *Dementia Praecox or the Group of Schizophrenias*. Trans. (1950) by J. Zinkin. New York, International Universities Press.
 COHEN, B. D., SENF, R., and HUSTON, P. E., *A.M.A. Arch. Neurol. Psychiat.*, 1954, **71**, 171.
 GATEWOOD, L., *Psychol. Monogr.*, 1909, **11**, No. 2 (Whole No. 45).
 GOLDSTEIN, K., *J. nerv. ment. Dis.*, 1943, **97**, 261.
 GOTTLIEB, J. S., BOBBITT, F. S., and FREIDINGER, A. W., *Psychosom. Med.*, 1952, **14**, 104.
 HUNT, J. McV., *Amer. J. Psychol.*, 1935, **47**, 458.
 HUSTON, P. E., and SENF, R., *Amer. J. Psychiat.*, 1952, **109**, 131.

- Idem*, SHAKOW, D., and RIGGS, L. A., *J. gen. Psychol.*, 1937, **16**, 39.
Idem, and SINGER, M., *A.M.A. Arch. Neurol. Psychiat.*, 1945, **53**, 365.
KENDIG, I., and RICHMOND, W. V., *Psychological Studies in Dementia Praecox*, 1940. Ann Arbor, Michigan, Edwards.
MAGARET, A., *J. abnorm. soc. Psychol.*, 1942, **37**, 511.
MALAMUD, W., and PALMER, E. M., *A.M.A. Arch. Neurol. Psychiat.*, 1938, **39**, 68.
MEADOW, A., GREENBLATT, M., FUNKENSTEIN, D. H., and SOLOMON, H. C., *J. nerv. ment. Dis.*, 1953, **118**, 332.
RABIN, A. I., *J. Psychol.*, 1941, **12**, 91.
RICKERS-OVSIANKINA, M., *J. gen. Psychol.*, 1937, **16**, 153.
RODNICK, E. H., and SHAKOW, D., *Amer. J. Psychiat.*, 1940, **97**, 214.
SENF, R., HUSTON, P. E., and COHEN, B. D., *J. abnorm. soc. Psychol.*, in press.
SHAKOW, D., *Nerv. ment. Dis. Monogr.*, 1946, No. 70.
SQUIRES, P. C., *Amer. J. Psychol.*, 1936, **48**, 169.
WHITEMAN, M., *J. abnorm. soc. Psychol.*, 1954, **49**, 266.

THE EFFECT OF CHLORPROMAZINE ("LARGACTIL") ON GLUCOSE TOLERANCE

By

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THE use of chlorpromazine is now firmly established in psychiatry (Delay *et al.*, 1952; Arnold *et al.*, 1953; Staehelin and Kielholtz, 1953; Anton-Stephens, 1954; Elkes and Elkes, 1954; Charatan, 1954). A hyperglycaemic effect in man has already been reported (Dobkin *et al.*, 1954), and might be of importance if, for example, in schizophrenia, chlorpromazine was combined with insulin coma treatment. The following investigation was carried out to study the effect of chlorpromazine on glucose tolerance.

METHODS AND MATERIALS

Eleven patients, all schizophrenics about to be treated with chlorpromazine were selected. There were 7 females (average age 30.3 years), and 4 males (average age 37.8 years). All the patients were taking the ordinary hospital diet. A control glucose tolerance curve was carried out in the fasting recumbent subject, after the ingestion of 50 gm. glucose in a single dose. The fasting blood sugar, and the blood sugar at $\frac{1}{2}$, 1, $1\frac{1}{2}$, 2, and $2\frac{1}{2}$ hours after the ingestion of glucose was estimated by the method of Folin and Wu on capillary blood. Two or 3 days later, the test was repeated with chlorpromazine 50 mgm. in 20 ml. normal saline given intravenously immediately following the ingestion of glucose by the patient.

RESULTS

TABLE I
GLUCOSE IN MGM. PER 100 ML. CAPILLARY BLOOD
(C=control, E=experimental data)

Patient	Age	Fasting		$\frac{1}{2}$ hour		1 hour		$1\frac{1}{2}$ hours		2 hours		$2\frac{1}{2}$ hours	
		C	E	C	E	C	E	C	E	C	E	C	E
1 (F)	20	90	93	166	141	170	121	107	123	90	128	95	123
2 (F)	34	95	88	179	147	149	163	113	189	124	158	67	154
3 (F)	22	106	98	161	118	138	115	152	179	124	146	76	110
4 (F)	18	124	107	198	297	179	304	170	252	129	325	90	154
5 (F)	58	97	102	163	196	176	116	136	172	125	172	97	112
6 (F)	42	98	106	202	124	196	196	144	210	126	176	110	172
7 (F)	18	90	93	130	144	160	225	88	240	78	192	100	147
8 (M)	31	112	118	150	176	162	198	118	132	100	130	84	120
9 (M)	45	110	110	140	161	228	264	244	251	170	185	88	117
10 (M)	42	92	83	166	189	115	216	78	156	97	150	99	97
11 (M)	33	101	126	200	172	185	196	122	188	78	184	84	152
Means		101.4	102.2	168.6	169.6	168.9	192.2	133.8	190.2	112.8	176.9	90.0	132.6
Standard error of the mean	..	3.363		14.49		17.46		12.78		16.29		7.773	
t	..	.0367		.063		1.332		4.41		3.932		5.475	
Significance	..	—		—		—		<0.01		<0.01		<0.01	

Expressed graphically, the results indicate that intravenous chlorpromazine causes a pronounced delay in the removal of glucose from the blood, following a single loading dose of glucose by mouth. This effect commences about 1 hour after injection, and continues up to $2\frac{1}{2}$ hours. The differences at $1\frac{1}{2}$, 2, and $2\frac{1}{2}$ hours are significant at the 1 per cent. level using the correlated t test (Fig. 1).

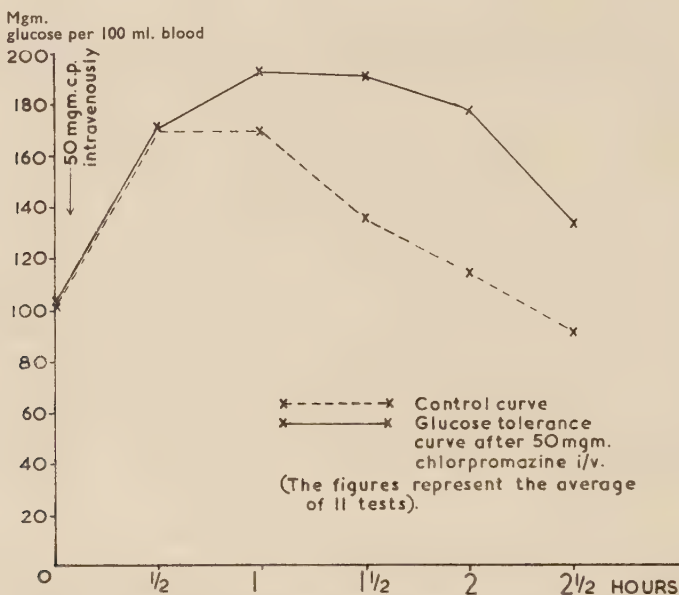


FIG. 1.—Effect of intravenous chlorpromazine ("largactil") on glucose tolerance curve.

DISCUSSION

Chlorpromazine is known to have a marked anti-adrenergic effect, and yet to have no effect on adrenaline induced hyperglycaemia in dogs (Courvoisier *et al.*, 1953). Theoretically, chlorpromazine would be expected to lead to a fall in blood sugar due to the unopposed action of insulin. The present investigation shows that the reverse of this anticipated effect occurs, intravenous chlorpromazine leading to a markedly slower fall in blood sugar, the mean level at $2\frac{1}{2}$ hours after ingestion of glucose remaining above the fasting level.

The explanation of the hyperglycaemic effect observed may be due to a depressant effect of chlorpromazine upon liver function. Lehmann and Hanrahan (1954) have reported alterations in serum proteins in patients receiving chlorpromazine, and Garmany *et al.* (1954) found abnormal bromsulphthalein retention in 3 patients taking the drug. On the other hand, if chlorpromazine stimulated the adrenal cortex, the observed results might be brought about by increased secretion of glucocorticoids leading to an increase in gluconeogenesis, and a decreased utilization of carbohydrate in the tissues. Further observation on the effect of chlorpromazine on liver function will be required to resolve this point, and in particular, the effect on galactose tolerance.

SUMMARY

In a group of 11 schizophrenic patients, intravenous chlorpromazine was shown to delay significantly the expected fall in blood glucose after the ingestion of 50 gm. glucose by mouth.

This effect is considered to be due to either a depressant effect of chlorpromazine on liver function, or alternatively to increased secretion of glucocorticoids from stimulation of the adrenal cortex.

REFERENCES

- ANTON-STEPHENS, D., *J. Ment. Sci.*, 1954, **100**, 543.
ARNOLD, O. H., HIFT, ST., and SOLMS, W., *Wiener Med. Wchnschr.*, 1953, **31**, 563-6.
CHARATAN, F. B. E., *J. Ment. Sci.*, 1954, **100**, 882.
COURVOISIER, S., FOURNEL, J., DUCROT, R., KOLSKY, M., and KRETSCHET, P., *Arch. Int. Pharmacodyn.*, 1953, **3-4**, 305.
DELAY, J., DENIKER, P., HARL, J. M., and GRASSET, A., *Ann. Méd.-Psych.*, 1952, **3**, 398-403.
DOBKIN, A. B., GILBERT, R. G. B., and LAMOUREUX, L., *Anaesthesia*, 1954, **9**, 157.
ELKES, J., and ELKES, C., *Brit. med. J.*, 1954, **2**, 560.
GARMANY, G., MAY, A. R., and FOLKSON, A., *Brit. med. J.*, 1954, **2**, 439.
LEHMANN, H. E., and HANRAHAN, G. E., *A.M.A. Arch. Neurol. Psychiat.*, 1954, **71**, 227.
STAEHELIN, J. E., and KIELHOLTZ, P., *Schweitz. Med. Wchnschr.*, 1953, **25**, 581.

DARK ADAPTATION IN NEUROTIC PATIENTS

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1. INTRODUCTION

SEVERAL studies have been undertaken in which the "dark vision" of normal and neurotic groups has been compared (see (5) for references). As a result of these researches it appears that neurotic patients tend to have inferior performances to normal subjects on tests of "dark vision". The term "dark vision" is, however, a very general one, covering all aspects of visual functioning at brightness levels below about 0.01 candle per square foot (13). Clearly we need to know more precisely *which* aspects of dark vision are impaired in neurotics, the *extent* of the impairment, the *conditions* under which it occurs, etc., if we are to go beyond fairly crude descriptive statements about differences between normal and neurotic groups to an understanding of the processes involved.

Of the many questions that need to be answered, a fairly basic one concerns the relative importance of the light and form senses in producing the observed differences. While work on the Livingston Rotating Hexagon test (10, 11) suggests an impairment of form perception in neurotics under conditions of low illumination, other research (6, 7) suggests that the light thresholds themselves may be impaired. Moreover, the writer's work (6) leads one to suppose that this impairment may extend over a large part, if not the whole range, of the rod portion of the adaptation curve.

However, owing to certain unsatisfactory features of the instrument used for measuring dark vision and the test procedure, information on this point is indefinite. In the first place, the instrument lacked a suitable scale of brightness for the plotting of threshold values throughout the dark adaptation period; secondly, it did not incorporate a unit for light-adapting the subject prior to the test; and, thirdly, viewing conditions were such that the angle subtended at the eye by the test field was rather too small in relation to the type of test object to provide information on the light sense as such.

In an attempt to obtain more precise information on the possible impairment of light thresholds in neurotics, the present study has been undertaken using a Crookes Adaptometer* and a somewhat different test procedure.

2. DESCRIPTION OF APPARATUS

The apparatus consists essentially of two parts, a "bleaching" or light adapting unit, and a dark adaptation test-light unit; these will be described in turn.

(a) *Light-adaptation Unit*

This consists of a cylinder with an arrangement of lamps and diffusing media arranged so as to give a uniform illumination of the surface of a sand-blasted "bleaching" bowl (see Fig. 1). The brightness of this bowl is 750 ml.

* The writer is greatly indebted to The Crookes Laboratories, Ltd., for the loan of the adaptometer and for permission to reproduce Fig. 1; and to Dr. J. I. M. Jones of their Research Laboratory for helpful discussion.

and the colour temperature approximately $2,750^{\circ}\text{K}$. This particular brightness value viewed for five minutes was selected as being sufficiently high to ensure that subsequent dark adaptation should not be too rapid to keep track of and also to make evident the cusp in the dark adaptation curve denoting the transition from cone to rod vision.

A further advantage of this particular level of brightness is that it tends not to give rise to complications due to after-images (1).

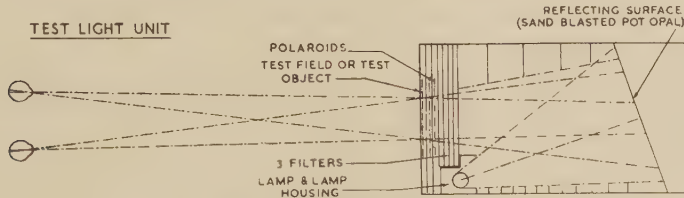


FIG. 1.—The Test-light Unit.

(b) *Dark-adaptation Test-light*

The test object consists of an arrow-head cut out of a metal diaphragm and appears against a background of sand-blasted pot opal illuminated by a lamp placed normal to its centre. The shape of the arrow was designed in such a way that no part can be seen as such before its shape as a whole is perceived. Its position can be varied (up, down, left or right) by means of a rod at the side of the instrument, thus providing some check on the subject's responses.

Owing to the fact that various points on the pot opal screen are at different distances from the lamp the brightness of the surface of the screen is not perfectly uniform. However, under conditions of binocular viewing and with summation operating the lack of uniformity is to some extent compensated for by the fact that a point of lower brightness for one eye corresponds to one of higher brightness for the other. Brightness of the test field can be varied by means of a combination of three neutral density filters and two polaroid discs* over a range of a million to one in steps of $\cdot 05$ log units.

The reflecting screen is viewed by the subject through the neutral density filters and polaroid discs at about 12° from the normal but with diffuse light this does not affect the brightness of the projected field. A facepiece and chin rest are mounted on a telescopic unit. When this is fully extended the facepiece is at a distance of two feet from the test-object, and at this distance the arrow subtends a visual angle of 7 degrees.

While the Crookes Adaptometer represents an improvement upon the instrument used in previous studies, it is not of course claimed that it is entirely free from criticism. Thus, there is no control over the retinal area stimulated, the natural pupil and not an artificial one is used, so that differences in adaptation due to differences in pupillary size are included in the results, and finally, a test *object* rather than a light-flash is used. These "limitations" are not, however, as serious as might at first appear, as Godding (4) has shown, but they should be borne in mind when evaluating results.

3. TEST PROCEDURE

The subject was seated before the facepiece of the instrument and it was explained to him that he would first be asked to lean forward and look into the

* Two neutral density filters have a transmission of $1/10$ (Density 1) and one a transmission of $1/100$ (Density 2). One of the polaroid discs is fixed and the other rotatable to give a continuous reduction in brightness to $1/10$.

bleaching bowl for five minutes. The light would then be switched off and he would be asked to look through the eyepiece and tell the experimenter immediately he saw the position of the arrow. The arrow would be in any one of four possible positions which he should report as "top", "bottom", "right" or "left".

With the subject in the correct position for light adaptation, eyes close to the bleaching bowl, the bleaching and test-lights were switched on (this ensures stabilization of the test-light before the dark adaptation test starts) and the subject instructed to look *in and around* the bleaching bowl so that all parts of the retina were light-adapted.

During the light-adaptation period the voltage of the test-light was adjusted to the standard voltage for the instrument, the first neutral density filter (1/100th) brought into position and the polaroid scale put at 2. This gives a brightness of $10^{6.4}$ micromicrolamberts (6.4 log units).

At the end of five minutes the bleaching light was switched off, a stopwatch was started and the subject asked to sit back and tell the experimenter which way the arrow was pointing. A final check was made on the voltage and the subject was told that it would take a little time for his eyes to become accustomed to the darkness. The time (to the nearest second) was noted when the arrow's position was seen. The brightness was immediately reduced by two units on the polaroid scale (i.e. 0.10 log units), the arrow rotated into a different position and the subject instructed once again to report as soon as he could see the arrow. The time was again recorded and this procedure was repeated throughout a thirty-minute period, various combinations of neutral density filters being used in conjunction with the polaroids to obtain the required range of brightness.

With regard to time of testing, practical considerations, especially in the case of the neurotic group, necessitated testing subjects at different times of the day. As far as possible these times were randomized over both neurotic and normal groups so as to reduce effects due to differences in pre-test illumination.

4. SUBJECTS

Twenty neurotic patients* and twenty normal controls were tested with the adaptometer. The neurotics ranged in age from 17 to 45 while the age range of the controls was 18-49, with means of 32 and 30, respectively. With only a small correlation between age and dark adaptation over the age range 17-50 (8, 12) it was not considered necessary to attempt any precise matching of the two groups.

With regard to other variables that were taken into account when selecting groups, an attempt was made to have groups roughly comparable in intelligence and socio-economic status. Small correlations between intelligence and dark vision tests have been reported from time to time (e.g. (6)) although owing to the use of many different experimental conditions and varying degrees of heterogeneity in the experimental populations their significance is difficult to assess in a general way. It is probable that the effect of intelligence, particularly with the simpler type of dark vision test, may be an indirect one reflecting differences in nutritional state (e.g. vitamin A) between different socio-economic groups.

* Grateful acknowledgment is due to the Physician-Superintendent of Belmont Hospital for permission to test the patients, and to the medical, psychological and nursing staff for their kind assistance.

Subjects with any history of diseases known to effect dark adaptation (such as gastritis, gastric or duodenal ulcer and cirrhosis of the liver) were excluded from the experiment, as were those with any history of vitamin A deficiency.

Finally, no subject was tested who had an uncorrected visual acuity of less than 6/9. Of the total number of subjects tested only two wore glasses; the estimated effect due to loss of light by reflection and absorption of lenses on threshold values is relatively small (4), probably not more than .05 log unit.

5. RESULTS AND DISCUSSION

A dark adaptation curve was plotted for each subject in the two groups. The distribution of threshold measures on which these curves were based is shown in Figures 2 and 3. Inspection of these distributions reveals several

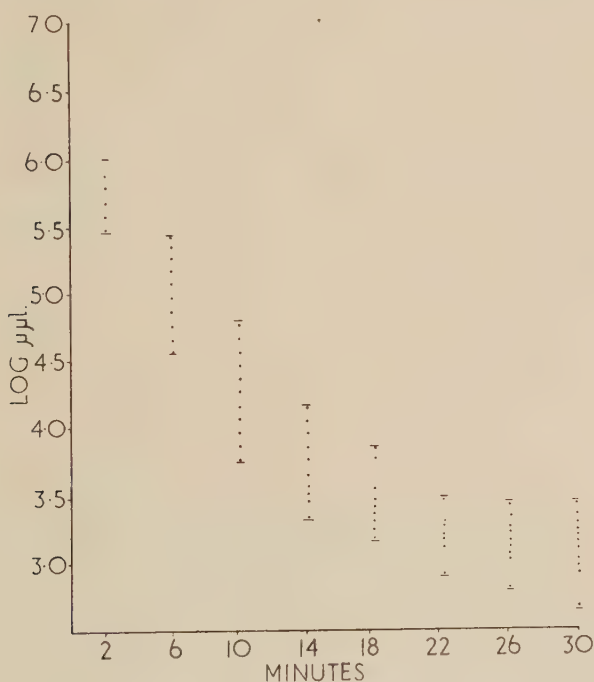


FIG. 2.—Distribution of Threshold Measures—Normal Group.

interesting features. In the first place, both distributions follow the same general pattern as regards shape. In the second place, the neurotic group is characterized by greater variability than the normal. Thirdly, in regard to level of sensitivity, there is some tendency for the neurotic group to be displaced upwards along the intensity axis.

The nature of these distributions makes it fairly clear that comparison of the normal and neurotic groups on the basis of means *alone* would be very inadequate. This does not of course imply that such a comparison would be invalid. In fact, the frequency distributions for both groups are sufficiently symmetrical for the means to represent their central tendencies fairly well.

Figure 4 shows the mean thresholds for the two groups over the 30-minute adaptation period and it will be seen that the neurotics have higher thresholds than the normals during the first few minutes after light adaptation. Particularly interesting is the fact that it is not until between six and eight minutes that the difference between groups becomes at all striking. This is about the transition-time for cone to rod vision and should this finding be confirmed it would be worthwhile pursuing in terms of the well-known duplicity theory of retinal functioning. However, our main interest in the present experiment is in the behaviour of the two groups over the rod portion of the curve, so we will consider the extent of the difference between them in terms of units of brightness.

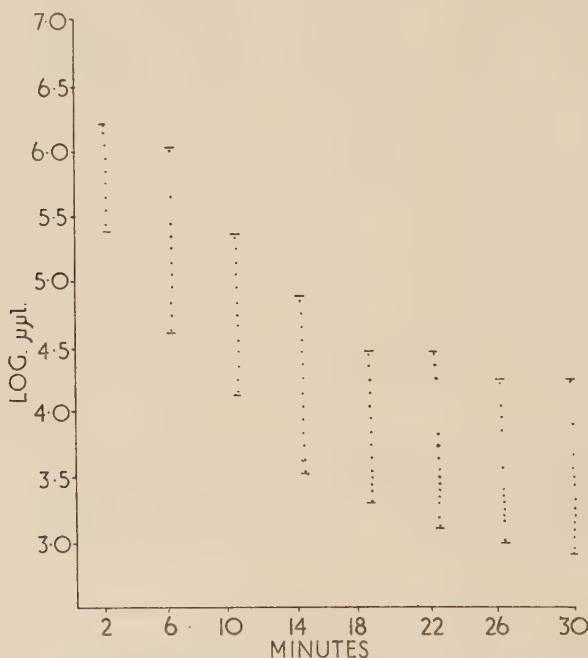


FIG. 3.—Distribution of Threshold Measures—Neurotic Group.

Starting at eight minutes, the difference between the means of the two groups amounts to as much as 0.3 log units (in other words, the neurotics require on the average about three times as much light as the normals to see the test-object); by ten minutes the difference has increased to about 0.4 log units and by twelve minutes to 0.5 log units. Thereafter the difference decreases to 0.3 log units at 16 minutes and decreases still further until at 18 minutes it is about 0.2 log units. For the final ten minutes or so of the adaptation period, the difference remains at about this level.

While these differences are of significant size from the psychophysical point of view, it must be remembered that there is considerable scatter about the means, particularly in the neurotic group. The standard deviation of threshold measures for the normal group is about 0.20 between 8 and 30 minutes (with a range of .26 to .16), while the neurotic group have a standard deviation of about .35 (range .40 to .31). Applying the usual significance tests to the differences in means at various periods of dark adaptation, we find that the differences reach significance at the .05 level between 8 and 22 minutes but fail

to reach significance thereafter. However, more important than tests of "significance" at a given point, is the general trend of the data. This is sufficiently obvious for the conclusion to be drawn that the neurotic group have higher mean thresholds over the rod portion of the adaptation curve. The extent of this difference varies somewhat from about 0.3 to 0.2 units with the difference decreasing as the final rod threshold is approached. Whether the result will generalize to other groups remains to be seen. Certainly it is in accordance with what previous research (6) had led us to expect.

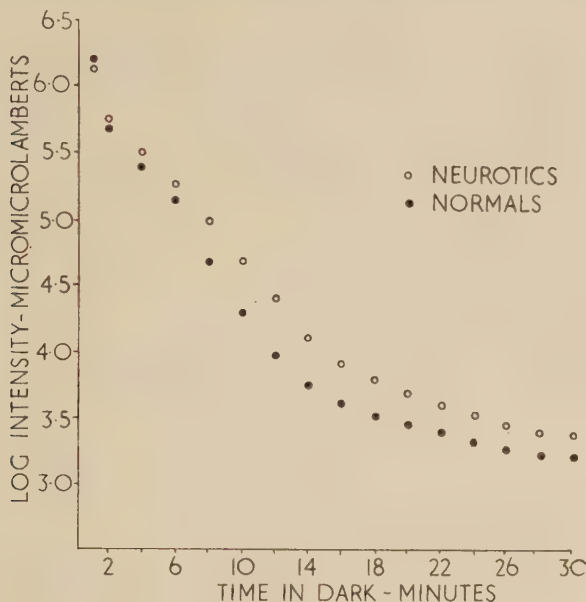


FIG. 4.—Mean Dark Adaptation Curves.

Although we may conclude that there is an overall difference in means between the two groups, the large scatter of threshold values about the mean in the neurotic group makes it necessary to examine individual curves more closely. When we do this, several interesting features appear; in fact, the incidental findings in this study are in certain respects of more interest than those directly related to the hypothesis under test.

In the first place, examination of the shape of individual curves shows a tendency for "steps" or "plateaux" to occur in certain cases, periods during which there is little or no increase in sensitivity. Taking as a rough quantitative criterion a period of two minutes or more during which the improvement in sensitivity is .05 log units or less, not including of course the cone-rod transition period and the final rod portion of the curve where flattening normally occurs, the interesting fact emerges that in 12 cases in the neurotic group, there is definite evidence of a plateau effect. Of these 12 cases, eight curves are those of anxiety cases, one is that of a patient suffering from hysteria with anxiety symptoms, one is the curve of a psychopath, one that of an obsessional neurotic and one the curve of a neurotic with very mixed symptoms who could not be classified into any specific category. Of the eight patients not showing the effect, three were hysterics,* two were psychopaths, one was an anxiety depressive,

* Two were very severe cases.

and two were anxiety states. Examples of curves showing the "plateau" effect are presented in Figure 5.

Now it is fairly obvious from the composition of our neurotic group that we cannot reach any definite conclusion as to the relationship between plateau effect and anxiety. But it is worth noting that among the eight anxiety states showing the effect, the mean "retardation time" in their sensitivity curves amounted to about six minutes compared with a mean of two minutes in those patients not diagnosed as anxiety states who showed the effect. In other words, the anxiety states did appear to show the effect to a greater extent. It is also of

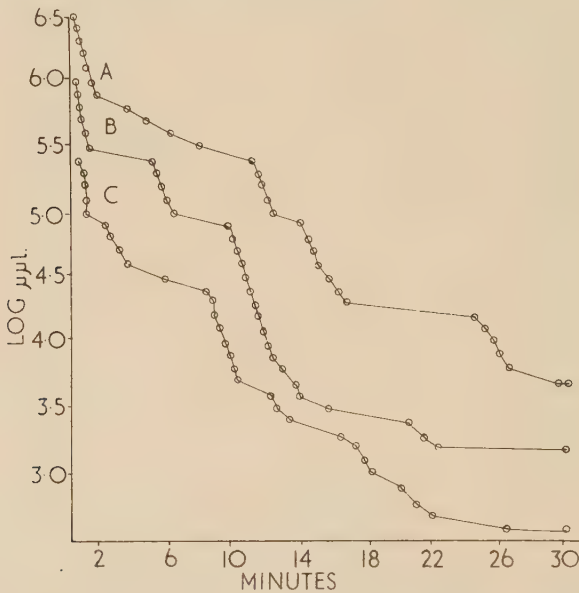


FIG. 5.—Examples of Adaptation Curves showing Plateau Effects (Curves B and C have been Displaced 0.5 and 1.0 Log Unit respectively along the Intensity Axis).

some interest to note that if psychopaths and hysterics are grouped together in accordance with the findings of some previous work at the Institute of Psychiatry (9), and the anxiety depressive and the obsessional are grouped with the anxiety states under the category of "dysthymic" neurotics, then out of six "hysterics" only one shows the "plateau" effect, whereas it is shown by nine out of twelve "dysthymic" patients.

Here again we cannot reach any definite conclusions owing to the fact that our neurotic group was not selected for the purpose of investigating differences between psychiatric sub-categories. However, in the author's view such evidence as we have suggests that further research into differences within the neurotic group would be profitable. It is also worth noting that the plateau effect occurs within the normal group, although to a lesser extent, and it is the writer's *opinion* that "plateau" effects occur more frequently in the curves of subjects who showed signs of anxiety in the test situation than in subjects who appeared more relaxed. But at the moment too much rests on opinion and we must clearly undertake further experiments to obtain more precise information. Before leaving the subject of "plateau" effects, the writer would point out that, having observed the apparent connection with anxiety states, he asked three other psychologists to examine the adaptation curves to confirm the finding.

As to the "explanation" of the plateaux, hypothesis-formation is best left until we have confirmed and quantified the effect. However, it does make a certain amount of sense in terms of previous research and tentative suggestions as to its nature will be put forward in a critical review now being prepared on "Dark vision as a measure of personality". In this paper the writer attempts to organize what little knowledge we have into some sort of coherent framework which can serve as a basis for further studies.

Turning next to other aspects of the dark adaptation curves of the neurotic group, it is interesting to note that of the three hysterics, two have very abnormal curves indeed in so far as level is concerned. It will be noted from Figure 6, where the curves are plotted, that both are shallow when compared with a typical normal curve, both have delayed cone-rod transition times and both have very high final thresholds. In fact, such curves may be regarded as falling within the "pathological" category; had they been obtained in a survey of dark adaptation in the normal population (8) they would probably have been regarded as possible cases of vitamin A deficiency. It is hoped to make a more detailed study of these two cases at a later date.

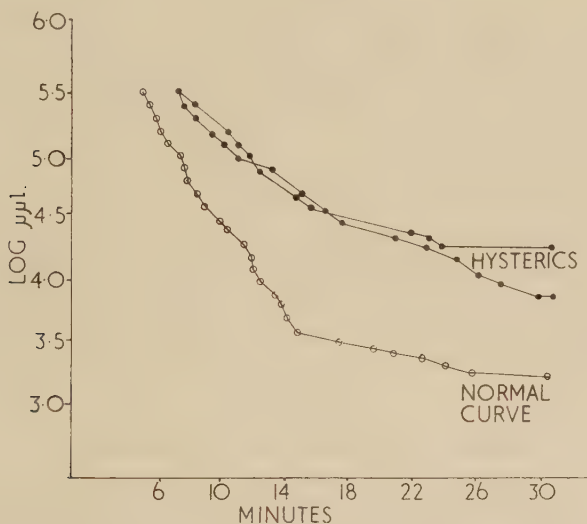


FIG. 6.—Comparison of Hysteric and Normal Adaptation Curves.

Four other curves within the neurotic group had high final thresholds but they all fell between 3.5 and 3.75 log units, well below the thresholds of the two hysterics. Furthermore, these four curves showed a much steeper slope over their rod portions than did those of the hysterics.

While there are several other interesting features of the adaptation curves, one is sufficiently striking to be mentioned here, namely, that the three psychopaths had very low final rod thresholds (3.15, 3.0 and 2.95 log units). All three thresholds fall within the upper range of the normal group. A threshold of 2.95 is equalled or exceeded by only two subjects in the normal group, one of 3.0 by three subjects and a threshold of 3.15 by six normal subjects.

It seems fair to conclude that further research involving a detailed examination of individual dark adaptation curves with regard to level, rate, fluctuations etc., will prove very rewarding indeed. In fact it would appear that different

aspects of personality may be reflected in different features of the adaptation curve and that the adaptation curves of psychiatric patients may serve to "highlight" some of these factors by displaying them in an exaggerated form.

While we have reason to be fairly enthusiastic about the possibility of tapping personality characteristics we must remember that an individual's dark adaptation curve is the resultant of many interacting forces, physical, physiological and psychological, some of which are due to fairly fortuitous and temporary circumstances. For instance, it is known that exposure to fairly intense illumination prior to the test can affect the adaptation process. We must also remember that there is considerable individual variation from day to day. While the actual amount is partly dependent upon the type of test used, experimental conditions, etc., day-to-day variation of as much as 0.3 log unit is commonly reported. One cannot, however, make any broad generalizations and much further work needs to be done before we shall be in a position to say how much is due to error of measurement, environmental variables, etc., and how much is due to variability in the organism itself.

SUMMARY

1. The object of this experiment was to determine if neurotic patients showed an impairment in their absolute light thresholds over the rod portion of the dark adaptation curve.
2. Twenty normal subjects and twenty neurotic patients were tested using the Crookes Adaptometer and mean dark adaptation curves plotted for the two groups.
3. Differences ranging from 0.2 to 0.5 log units ($\mu\mu l$) at different periods of adaptation were found, the neurotics having higher thresholds than the normals at all points of the rod adaptation curve.
4. Scatter about the means, however, was considerable, particularly in the neurotic group whose average standard deviation was about 0.3 log units, and an examination of individual curves was therefore undertaken.
5. This analysis revealed differences within the neurotic group that appeared to be related to diagnostic category. Plateau effects in the adaptation curve seemed to be associated with anxiety states rather than with hysterics or psychopaths; high final thresholds with hysterics, and low thresholds with psychopaths.
6. As a result of these observations it was considered that further research should be undertaken with another group of neurotic patients in which each of the various sub-categories was more adequately represented.

REFERENCES

1. CRAIK, K. J., and VERNON, M. D., "The nature of dark adaptation", *Brit. J. Psychol.*, 1941, **32**, 62-81.
2. *Idem*, "Perception during dark adaptation", *Brit. J. Psychol.*, 1942, **32**, 206-230.
3. FISHER, R. A., *Statistical Methods for Research Workers*, 1936. London, Oliver & Boyd.
4. GODDING, E. W., "An instrument for testing dark adaptation", *Proc. roy. Soc. Med.*, 1945, **38**, (4), 155-167.
5. GRANGER, G. W., "Personality and visual perception: a review", *J. ment. Sci.*, 1953, **99**, 8-43.
6. *Idem*, "The night visual ability of psychiatric patients", *Brit. J. physiol. Opt.*, 1954, **11**, 238-244.
7. GRAVELY, A. M., Ph.D. Thesis, 1950. Univ. London.
8. HECHT, S., and MANDELBAUM, J., "The relation between vitamin A and dark adaptation", *J. Amer. med. Assn.*, 1939, **112**, 1910-1916.
9. HILDEBRAND, H. P., Ph.D. Thesis, 1954. Univ. London.
10. LIVINGSTON, P. C., and BOLTON, B., "Night visual capacity in psychological cases", *Lancet*, 1943, **1**, 263.
11. REES, W. L. L., "Night visual capacity of neurotic soldiers", *J. Neurol. Neurol. Psychiat.*, 1945, **8**, 34-39.
12. ROBERTSON, G. W., and YUDKIN, J., "Studies of dark adaptation as a means of detecting vitamin A deficiency", *Brit. J. Ophthal.*, 1944, **28**, 556.
13. WRIGHT, W. D., "Night Vision". In *Modern Trends in Ophthalmology*. (Ed.: A. Sorsby.) 1948. London, Butterworth.

BIOCHEMICAL CHANGES FOLLOWING ELECTROSHOCK*

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EXPERIMENTS with animals have shown that electrostimulation of brain tissue is followed by a number of biochemical changes in the brain. The information obtainable is limited since there are only comparatively few reports about investigations in this field (4).

Previously it has been shown that a rise in glutamic acid concentration in plasma obtained from peripheral veins occurs after electrostimulation in man (3). We have tried to follow this rise in glutamic acid concentration in relation to electroshock in order to evaluate the part played by some organs during the procedure.

Thus venous blood was obtained from brain, kidney, muscles, and liver. The glutamic acid concentration in venous blood from these organs was determined before and after electroshock. Blood samples were taken through a thin catheter introduced through a bared arm vein. The tip of the catheter was directed under fluoroscopy to the desired vein.

Blood from the organ to be examined must be collected within 60 seconds from the electric stimulation of the brain, otherwise admixture of blood from other areas cannot be avoided. In a few instances it was difficult to observe this time limit.

Light anaesthesia with thiopentone was administered during catheterization. During the electroshock complete muscle relaxation was obtained with succinylcholine iodide.

Krebs' enzymatic method was used to determine the glutamic acid concentration in the plasma (1, 2).

The described procedure was carried out in nine schizophrenic patients: five acute and four chronic cases.

In six of these patients (two acute and four chronic) the blood sugar concentration, and the potassium and the phosphate levels in the bulb of the jugular vein were determined in the blood samples as well.

Glutamic acid concentration in relation to electrostimulation (Table I)

In four of the nine patients examined the tip of the catheter was placed in the bulb of the internal jugular vein, in five cases in one of the renal veins.

In three out of the four cases with the catheter in the bulbar part of the

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jugular vein during electrostimulation there was no rise of glutamic acid after the shock. In one case there was a moderate increase which must probably be ascribed to admixture of blood from other venous areas, due to technical difficulties in blood sampling.

In all the five experiments with the tip of the catheter in one of the renal veins there was a fairly pronounced increase in the glutamic acid concentration.

All the five cases in which blood from the veins of the extremities was examined immediately after electroshock revealed pronounced rise in glutamic acid concentration.

Glucose, potassium and phosphate (Table II)

The glucose and phosphate levels before and after electroshock showed no significant variations in the blood from the bulb of the jugular vein.

The blood sugar concentrations varied considerably, above as well as below normal figures. The potassium level in the jugular vein showed a slight increase following electrostimulation.

Control

To control the effect of thiopentone alone and thiopentone-scoline blood, samples were taken before and after the administration of these drugs. They showed a rise in glutamic acid level after administration of succinylcholine iodide.

DISCUSSION

These investigations seem to indicate that the increase of glutamic acid concentrations in plasma after electroshock must probably mainly originate in muscles or in the kidney, or in both. It is not yet possible to offer a satisfactory explanation of the glutamic acid increase in the blood from the two organs mentioned. There is nothing to indicate that the glutamic acid derives from brain tissue. The rise in glutamic acid concentration after scoline alone may be caused by the characteristic twitch often accompanying injections of this substance—possibly by depolarization over a protracted period.

CONCLUSION

1. Brain tissue has not been found to supply glutamic acid to venous blood following electrostimulation.

Blood from muscles and kidney show a rise in glutamic acid concentration following electrostimulation of the brain.

2. A slight, but significant, increase of potassium concentration in the blood of the jugular vein has been demonstrated.

REFERENCES

1. ASTRUP, P., and MUNKVAD, I., "On the determination of glutamine and glutamic acid in plasma", *Scand. Jour. Clin. and Lab. Invest.*, 1950, **2**, 133.
2. KREBS, H. A., "Quantitative determination of glutamine and glutamic acid", *Biochem. J.*, 1948, **43**, 51.
3. MUNKVAD, I., "Glutaminsyre og glutaminbestemmelser i plasma paa et psykiatrisk patientmateriale", Thesis, 1951, Copenhagen.
4. RICHTER, D., and DAWSON, R. C., "The ammonia and glutamine content of the brain", *J. Biol. Chem.*, 1948, **176**, 1199.

INVESTIGATIONS INTO GLUTAMIC ACID METABOLISM IN SCHIZOPHRENICS*

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EARLIER investigations (3, 4) have shown an abnormal glutamic acid metabolism in schizophrenic patients.

These changes are, briefly, low glutamic acid level (and high glutamine level) especially in acute cases. Glutamic acid concentrations below 1.2 milligrams per 100 ml. venous blood were ascertained in most of these patients.

In an attempt to explain these observations further investigations have been carried out by us. It has been tried, by venous catheterization, to obtain samples of venous blood from brain, kidney, muscles and liver. Simultaneous samples of arterial blood have been taken and the arterio/venous glutamic acid and glutamine deficiency have been determined in order to elucidate the part played by these organs in glutamic acid metabolism.

The technique has been as follows:

During light pentothal anaesthesia a thin plastic catheter was introduced through a bared arm vein. The tip of the catheter was directed under fluoroscopy to the desired vein of the organs mentioned.

Thus venous blood samples were withdrawn, and arterial blood simultaneously obtained by puncture of the femoral artery.

Analyses of glutamic acid and glutamine concentrations were carried out by H. A. Krebs' enzymatic method (2). Double analyses were invariably performed.

The mean error of single determinations of glutamic acid concentrations according to this method has previously (1, 3) been found to be 0.36 milligram; of glutamine 0.21 milligram per 100 ml.

In 20 normal adults the mean glutamic acid level has been ascertained to be 2.3 milligrams (lowest mean level in normal series: 1.2 milligrams).

In the identical normal series the mean glutamine level was 7.6 milligrams (1, 3).

Catheterization was performed on 11 schizophrenics—in four cases combined with arterial puncture. A control group was made up of six mentally healthy patients with heart diseases. All catheterizations were uncomplicated. In four other cases of mentally healthy persons parallel determinations of glutamic acid and glutamine were made in arterial and venous blood.

* Supported by grants from King Christian X Foundation and the Danish State Scientific Foundation.

Figure 1 shows the glutamic acid concentration in the control group.

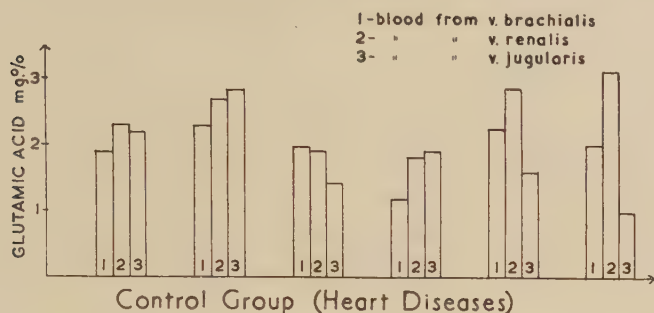


FIG. 1.

The glutamic acid concentrations are above 1.2 mg. in venous blood of muscles, kidney and brain, and the concentrations are of equal magnitudes in the blood of peripheral veins and arteries.

The result from the 11 schizophrenics will be presented in two groups, A and B: chronic and acute cases.

Group A: 5 chronic patients mainly of the catatonic type with clinical pictures unaltered for years and an average duration of the disease of about 15 years.

It appears from Figure 2 that the most constant feature was low glutamic acid concentration in the renal vein; in only one of the five patients (K.B.) this concentration exceeds 1.2 milligrams.

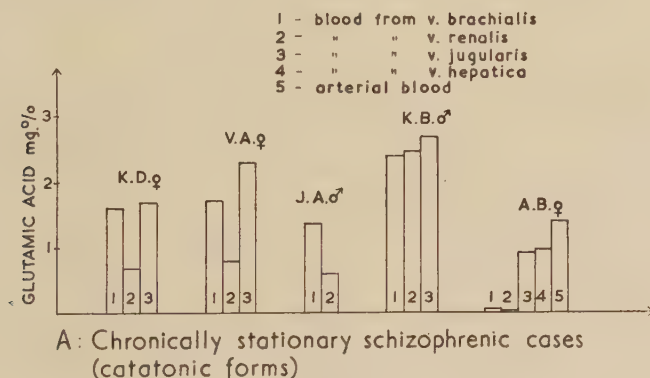


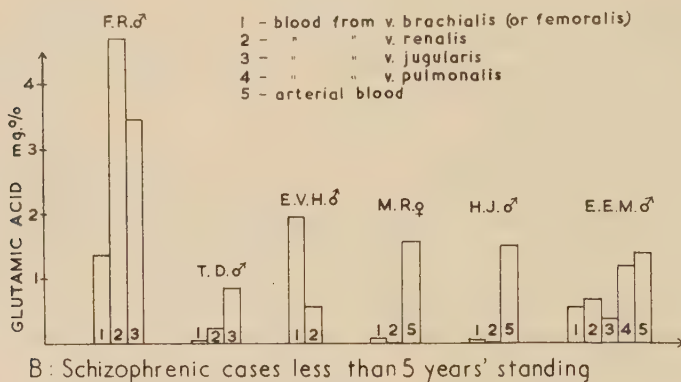
FIG. 2.

In four out of the five patients examined the glutamic acid concentrations in the brachial and jugular veins were above 1.2 milligrams, or within "normal" figures. In one patient (A.B.) low glutamic acid concentrations were ascertained in all blood samples—lowest, however, in the renal and brachial veins. In this patient the glutamic acid concentration was also determined in arterial blood. As far as kidney and extremities are concerned this case presents a pronounced arterio-venous glutamic acid deficiency.

Group B: 6 schizophrenics with comparatively short standing of the disease—1½ to 5 years. They had been able to manage without hospitalization for long periods, but had had to be admitted on account of deterioration.

At the time of examination the patients were in a bad clinical condition. A single patient (E.E.M.) was examined during an interval in the insulin-coma-treatment; the five other patients had remained untreated for at least four months prior to examination.

The results are seen from Figure 3. Four patients showed low glutamic acid concentrations in all regions examined. One patient (F.R.), however, had normal glutamic acid concentrations in all examined veins, and in another (E.V.H.) the concentration was normal in blood from peripheral veins. In this group the glutamic acid concentration was determined in the pulmonary artery of one patient (E.E.M.): it was ascertained to equal that of the arterial blood, which must be taken to indicate that in this patient the glutamic acid does not undergo any changes during pulmonary circulation.



B: Schizophrenic cases less than 5 years' standing

FIG. 3.

In the three cases within this group of patients in which arterial puncture was performed (M.R., H.J., E.E.M.) the glutamic acid concentrations in arterial blood were essentially higher than in the blood of the venous regions.

The glutamic acid concentrations in the blood of peripheral veins do not vary during a period of 20 minutes' anaesthesia.

The glutamine concentrations showed no significant deviation and have, therefore, not been included in the figures here reproduced; they were within "normal" limits.

In summing up it can be stated that the investigations here reported would indicate that the glutamic acid metabolism—especially in schizophrenics with comparatively brief case histories—is abnormal in brain, kidney and muscle tissue, as compared with the metabolism in normal persons.

CONCLUSION

1. In six mentally normal persons the glutamic acid concentrations have been ascertained to be above 1.2 milligrams per 100 millilitres in venous blood of muscles, kidney and brain.

The glutamic acid concentrations in mentally normal persons are of equal magnitudes in the blood of peripheral veins and arteries.

2. In four out of the five chronic schizophrenics examined there are low glutamic acid concentrations in the renal vein: presumably an indication of arterio-venous glutamic acid deficiency.

3. In four out of the six acute cases of schizophrenia examined there are low glutamic acid concentrations in both the jugular and renal veins and in veins of muscles: indicating arterio-venous glutamic acid deficiency in these organs.

4. The glutamine concentrations showed no significant deviations.

REFERENCES

1. ASTRUP, P., and MUNKVAD, I., "On the determination of glutamine and glutamic acid in plasma", *Scand. Jour. Clin. and Lab. Invest.*, 1950, **2**, 133.
2. KREBS, H. A., "Quantitative determination of glutamine and glutamic acid", *Biochem. J.*, 1948, **43**, 51.
3. MUNKVAD, I., "Glutaminsyre og glutaminbestemmelser i plasma paa et psykiatrisk patientmateriale", Thesis, 1951, Copenhagen.
4. *Idem*, "Determinations of glutamine and glutamic acid in a material of mental patients", Preliminary report. *Acta psych. et neurol.*, 1950, **25**, 269.

ON THE VALIDITY OF THE RORSCHACH TEST IN THE DIAGNOSIS OF INTRACRANIAL DAMAGE AND PATHOLOGY

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INTRODUCTION

SINCE the publication of Rorschach's Form Interpretation Test in 1921, its applications have been extended to cover an increasing number of clinico-psychological problems. Of these, one of the most important and difficult is the diagnosis of organic brain damage and pathology.

It is the purpose of this paper both to investigate the validity of five sets of Rorschach signs used in the diagnosis of organic brain damage and pathology and to discuss the problems of interpretation to which these signs give rise. The signs are those of Piotrowski (1936, 1937), Harrower-Erickson (1940), Ross *et al.* (1944), Hughes (1948) and Dorken *et al.* (1951).

In one of his researches (1937) Piotrowski made use of 33 Rorschach records of which 18 were cases of brain injury, 10 non-cerebral disturbances of the central nervous system and 5 conversion hysterias. On the basis of these records, his own previous work and that of others,* he formulated ten signs which would differentiate his cortical-subcortical group from the others.

He found an average of 6.2 signs in the cortical-subcortical group and only 1.5 in the group which showed no cerebral involvement (cortical or sub-cortical) but who were suffering from an organic disease of the central nervous system. Each of the cortical groups had more "signs" than any member of the non-cortical group. No member of the non-cerebral group had more than 3 "signs", whilst no one in the cortical group had less than 4. His conclusion was, "If one finds five or more abnormal signs in a Rorschach record, one's conclusions of the existence of an organic cerebral involvement can be suggestive but not decisive". He added that the signs should not be used without taking into account qualitative features of the record and should not omit clinical material gained from other diagnostic methods. But he failed to mention the location, type of lesion, and whether it was pre- or post-operative. It is almost as though he considered the various lesions without distinction, apparently similar conclusions on this point were reached by Nadel (1938) and Dorken *et al.* (1951).

Harrower-Erickson (1940a) investigated the usefulness of the Rorschach test as a means of estimating the "changed" personality of patients with cerebral tumours. This was done by contrasting the results of 28 cases with verified brain-tumours, with normal psychograms obtained from 2 normal groups and a hypothetical normal person. The two normal groups were provided by 10 scientists and 10 hospital employees. The outstanding characteristics of tumour cases were their uniformity and constriction. It was as though the brain injury resulted in a uniform personality which depended little on age, sex, education and experience. She revised this view (1940b) after investigating patients with

* Oberholzer (1931), Rorschach (1932).

focal epilepsy—"... it is obvious that the restriction and constriction shown in the records of patients with cerebral tumour are not characteristic of all types of cerebral lesions. Of the 10 patients with focal epilepsy studied pre-operatively and post-operatively, the record of only one showed a similarity to this Rorschach picture."

In the first of her studies the 28 tumour cases consisted of ten who had rapidly growing tumours (glioblastomas and carcinomas), whilst the remaining eighteen records were of slowly growing tumours (astrocytomas, meningeal fibroblastomas, oligodendrogliomas and cystic astrocytomas), i.e. all were infiltrating lesions.

The second of her investigations dealt with the records of 24 patients with focal epilepsy. They had all been operated on for the removal of scar tissue or areas of atrophy or microgyria, i.e. all were non-expanding atrophic lesions.

The focal epileptics with non-expanding atrophic lesions failed to give the typical organic pattern as found in the study of expanding lesions. From the 2 studies the following observations were made:

1. "The approximation of the tumour psychogram appears to be correlated with topographically extensive or diffuse cerebral damage" (1940b).
2. "Although widespread and diffuse cerebral damage (tumours, increased intracranial pressure and large incomplete removal of tissue) may yield Rorschach records of the restricted type, cerebral damage of a more discrete type, such as is seen in many cases of focal epilepsy, need not give such a personality picture. In these cases the Rorschach records may (pre-operatively) be of such a type as to suggest that the patient is capable of a wider range of psychological reactivity but is inhibited by mental and physical factors from functioning adequately" (1940b).

Ross *et al.* (1944) extended the sign approach to include the measurement of "neurotic" and "organic" symptoms in the same Rorschach protocol. An instability and disability rating was developed to measure the neurotic and organic symptoms respectively.

Four groups of signs were found which differentiated between normal, "organics", and psychoneurotics. They were:

- (a) Those common to neurotic and "organic" groups.
- (b) The neurotic differential signs.
- (c) The "organic" differential signs.
- (d) The "organic" excluding signs.

Weights were given to each sign in approximate proportion to its incidence in the groups compared. The four sets of scores were then combined to give 2 ratings. The "common" and "neurotic" scores were added together for the "Instability Rating" whilst the "Disability Rating" was obtained by adding the "common" and "organic" scores and subtracting the "neurotic" and "organic excluding" scores.

Tentative levels of ratings were given:

1. Without any evidence of neurotic trends or any significant evidence of brain damage, with an I.Q. around 100, Instability 12.1 plus, minus 1.24; Disability 8.0 plus, minus 1.61.
2. Neurotic personality background, no significant brain damage elicited, I.Q. around 100, Instability rating 18.4 plus, minus 1.61; Disability 8.4 plus, minus 1.34.
3. Manifest psychoneurosis, unknown I.Q., Instability 17.9 plus, minus 1.53; Disability 8.4 plus, minus 1.3.

4. Evidence of brain disease or damage, unknown I.Q., Instability 8.75 plus, minus 2.42; Disability 25.1 plus, minus 2.69.
5. No symptoms, I.Q. probably over 120, Instability 3.6 plus, minus 0.66; Disability 1.1 plus, minus .75.

The ratings were found capable of differentiating significantly between "neurotics" and "organics" (i.e. for both the Instability and Disability scores), and between "slight" and marked brain damage (only significant for Disability Scale).

Hughes (1948) started with the hypothesis that if psychoneurosis, schizophrenia and organic pathology exist as clinical entities, and if they are measured by any Rorschach signs, then these signs should be intercorrelated and form definable clusters or factors.

For his initial factorial analysis he used 32 "organics", 39 neurotics and 29 schizophrenics, for a later investigation 50 "organics", 18 schizophrenics, 74 neurotics and 26 normals. The presence or absence of each of the psychoneurotic, organic and schizophrenic signs of Harrower-Erickson, Piotrowski and Klopfer and Kelley respectively, were recorded. A factorial analysis using Thurstone's complete Centroid Method was carried out. Rotation was continued until loadings were either maximal or vanished. Eight orthogonal factors were obtained. The factor loadings were then assigned weights which were used on each record and the distribution of each factor's scores in each entity calculated. The next step was the calculation of the correlation between the presence or absence of each diagnostic entity and obtained factor score. Finally the probability, using these signs, of correctly diagnosing the organic cases was calculated. If a "cut-off" score of 7 was taken as diagnostic of organic pathology or damage, 82 per cent. of the organics in his sample would be correctly diagnosed with a misclassification of 1 per cent.

Dorken *et al.* (1951) following work with Piotrowski's (1937) organic signs and Ross's (1944) Disability Scale came to the conclusion that the capacity of these ratings varied according to whether the lesion was diffuse or localized or according to the localization of the lesion.

They attempted to describe organic brain damage in terms of deficit. The absence of 7 quantitatively evaluated signs was a probable indication of organic impairment, whilst their presence to a specified degree served to exclude the diagnosis of organic defect. The 7 signs were applied to 4 separate groups of patients with known localized brain lesions, and to two groups of patients with diffuse lesions. Control groups of schizophrenics, manic depressives, psychoneurotics, and superior and average "normals" showed the differentiating ability of these signs. From the absence of these signs an "organic deficit" rating was calculated. The authors give the warning that the ratings are sensitive to both limitations and impairment of intelligence.

PROBLEM I

The problem is to assess the validity of the five sets of signs and to note the percentage of misclassifications. For this purpose the first investigation was carried out irrespective of such important variables as age and intelligence, i.e. under such conditions of referral as obtain in hospitals. From the results obtained it may be possible to suggest reasons for the inadequacy of the signs to discriminate between organics and functionals and to account for the large number of misclassifications.

METHOD

The Rorschach records of an unselected group of patients and "normal" subjects were analysed and scored according to the signs of Piotrowski (1937), Harrower-Erickson (1940), Ross *et al.* (1944), Hughes (1948) and Dorken *et al.* (1951).

The group consisted of 125 subjects of whom 13 were normals of superior intelligence, 41 neurotics, 22 schizophrenics, 11 mental defectives, 12 psychopaths, 10 idiopathic epileptics and 16 organics.

The validity of these signs in correctly diagnosing organic brain damage and the extent of the misclassifications in diagnosing as brain damaged subjects in the remaining groups was noted.

RESULTS I

TABLE I
The Percentage Validity and Misclassification Using Piotrowski's (1937) Signs

	Normals	Neurotics	Schizophrenics	Idiopathic Epileptics	Psychopaths	M.D.'s	Organics
Total Number	13	41	22	10	12	11	16
5 or more signs . .	0	1	3	1	0	5	9
Validity (per cent.)	100	97.56	86.36	90	100	54.55	56.25
Misclassification (per cent.) . .	0	2.44	13.64	10	0	45.45	43.75

Total Validity (per cent.)—56.25.

Total Misclassification (per cent.) (excluding organics)—9.18.

Total Misclassification (per cent.) (including organics)—13.6

TABLE II
The Percentage Validity and Misclassification Using Harrower-Erickson (1940) Signs

	Normals	Neurotics	Schizophrenics	Idiopathic Epileptics	Psychopaths	M.D.'s	Organics
Total Number	13	41	22	10	12	11	16
4 or more signs . .	0	5	5	2	2	10	12
Validity (per cent.)	100	87.81	77.28	80	83.34	9.1	75
Misclassification (per cent.) . .	0	12.19	22.72	20	16.66	90.9	25

Total Validity (per cent.)—75.

Total Misclassification (per cent.) (excluding organics)—22.02.

Total Misclassification (per cent.) (including organics)—22.4.

TABLE III
*The Percentage Validity and Misclassification Using the Ross *et al.* (1944) Signs*

	Normals	Neurotics	Schizophrenics	Idiopathic Epileptics	Psychopaths	M.D.'s	Organics
Total Number	13	41	22	10	12	11	16
Score of 17 or 17+	0	1	5	3	1	10	10
Validity (per cent.)	100	97.56	77.28	70	91.67	9.1	62.5
Misclassification (per cent.) . .	0	2.44	22.72	30	8.33	90.9	37.5

Total Validity (per cent.)—62.5.

Total Misclassification (per cent.) (excluding organics)—18.34.

Total Misclassification (per cent.) (including organics)—20.8.

TABLE IV
The Percentage Validity and Misclassification Using the Hughes (1948) Signs

	Normals	Neurotics	Schizophrenics	Idiopathic Epileptics	Psychopaths	M.D.'s	Organics
Total Number	13	41	22	10	12	11	16
Score of 7 or 7+	0	1	0	0	0	2	11
Validity (per cent.)	100	97.56	100	100	100	81.82	68.75
Misclassification (per cent.) . .	0	2.44	0	0	0	18.18	31.25

Total Validity (per cent.)—68.75.

Total Misclassification (per cent.) (excluding organics)—2.75.

Total Misclassification (per cent.) (including organics)—6.4.

TABLE V
The Percentage Validity and Misclassification Using the Dorken et al. (1951) Signs

	Normals	Neurotics	Schizo- phrenics	Idiopathic Epileptics	Psycho- paths	M.D.'s	Organics
Total Number	13	41	22	10	12	11	16
Score of 2, 3 or below ..	1	15	9	5	3	11	12
Validity (per cent.)	92.31	63.42	59.1	50	75	0	75
Misclassification (per cent.) ..	7.69	36.58	40.9	50	25	100	25

Total Validity (per cent.)—75.

Total Misclassification (per cent.) (excluding organics)—40.366.

Total Misclassification (per cent.) (including organics)—38.4.

TABLE VI
Validity of the "Signs" for the Brain-damaged Group
Diagnostic of Brain-damage (X)

Subject	Age	Sex	Pre or Post Operative	Diagnosis	Piotrowski	Harrower- Erickson	Hughes	Ross and Ross	Dorken and Kral
1.	56	M	Pre	Left parietal cerebral tumour ..	X	X	X	X	X
2.	40	M	Pre	Right temporal cerebral neoplasm ..	—	—	—	—	—
3.	38	F	Pre	Cortico-thrombo phlebitis ..	X	X	X	X	X
4.	40	M	Post	Aneurysm anterior communicating artery, 2 recent subarachnoid haemor- rhages with right hemiparesis following the last ..	X	X	X	X	X
5.	27	F	Post	Aneurysm of right middle cerebral artery, 2 recent subarachnoid haemor- rhages ..	—	X	X	X	X
6.	43	M	Post	Aneurysm of right anterior cerebral artery, Right frontal craniotomy per- formed ..	X	X	X	X	X
7.	46	M	Post	Frontal lobectomy—excision of left frontal cystic glioma ..	X	X	X	—	X
8.	51	F	Post	Calcified glioma posterior part left temporal lobe ..	X	X	X	X	X
9.	16	F	—	Sydenham's Chorea ..	—	—	—	—	—
10.	43	F	—	Huntington's Chorea (early) ..	—	X	—	—	X
11.	13	M	—	Toxic Confusional State ..	X	X	X	X	X
12.	49	M	—	Carbon Monoxide Poisoning ..	—	X	X	X	X
13.	39	M	—	Acute Alcoholism with early D.T.'s ..	—	—	—	X	X
14.	58	F	—	Organic Dementia ..	—	—	—	—	—
15.	68	F	—	Organic Dementia ..	X	X	X	X	X
16.	45	F	—	Organic Dementia ..	X	X	X	—	—

DISCUSSION

All of the signs are capable of varying degrees of validity in the diagnosis of "organic" brain damage, though the number of misclassifications in the "functional" illnesses and organics is still far too large (see Tables I–V). Similar misclassifications to these were obtained by Ross (1941), who carried out a cross validation study of Piotrowski's ten signs. His results, showing the total number and total percentage per group of cases with five or more signs are:

Group	5 or more Signs	Per cent. of Subjects with 5 or more Signs
1. Cerebral Lesions*	10	55
2. C.N.S. Lesions†	18	
—non-cortical	3	
—sub-cortical	10	30

* Cerebral Lesions—These included tumours, G.P.I., Hydrocephalus (inflammatory), Post-traumatic Epilepsy, Post-traumatic Confusion.

† C.N.S. Lesions—Multiple Sclerosis, Tabes Dorsalis, Parkinsonism, Huntington's Chorea.

Group	5 or more Signs	Per cent. of Subjects with 5 or more Signs
3. Psychoneurotics	6 — 42	14
4. Somatic illnesses free from neurotic features*	1 — 19	5
5. Somatic illnesses with neurotic features ..	0 — 26	0
6. Psychotics	3 — 15	20
7. Epileptics†	7 — 19	37
8. Soldiers	1 — 53	2
9. Superior normals	0 — 34	0

* Somatic illnesses free from neurotic features—Hypertension, coronary occlusion, toxic goitre, gastric and duodenal ulcer, rheumatoid arthritis, acromegaly, myasthenia gravis and migraine.

† Epilepsy—"Clinically diagnosed epileptics in which no specific conclusion was reached as to the pathological basis" (Ross, 1941).

His conclusion was, "It would seem, then, that, although five or more of these signs occur most often in patients with diseases of the cerebral cortex and subcortical tissue, they are not specific for these lesions. They would seem to represent a deviation which is shown to a most marked degree when there is considerable involvement of the cerebral cortex, but which occurs to varying degrees with other disturbances of the nervous system, including the so-called 'functional-disturbances.' "

Evidently the signs fail to discriminate adequately between organics and functionals, show too many misclassifications and are susceptible to the influence of a considerable number of variables.

Such reasons as the following may account for the inadequacy of the existing criteria.

1. *Low intelligence seems to be an important determinant in the incidence of Rorschach organic signs, irrespective of the presence or absence of cerebral damage.* In contrast the number of misclassifications for the "superior" normals is negligible. The very high percentage of misclassifications for the M.D. group and negligible misclassifications for the "superior" normals are illustrated (see also Tables I-V).

	Piotrowski	Harrower-Erickson	Hughes	Ross <i>et al.</i>	Dorken <i>et al.</i>
Misclassification for M.D.'s (per cent) ..	45	91	18	91	100
Misclassification for superior normals (per cent.) ..	0	0	0	0	7.69

In addition to these results considerable direct and indirect confirmation can be found in the literature for the hypothesis that low intelligence increases

the number of "organic" signs irrespective of brain damage. In four of the studies quoted, Harrower-Erickson (1940a), Ross (1941), Ross *et al.* (1944) and Dorken *et al.* (1951) some account has been taken of intelligence. Their results revealed the particular sensitivity of Rorschach signs either to low or impaired intelligence. Harrower-Erickson's comment on the comparison of her "superior" and "average" normal groups is significant. "When one compares the 'superior' and 'average' normal groups as to their composite pictures one finds several differences which are not surprising. The output in the superior group is somewhat higher (R, 38 and R, 25). The relation of W:D:d is shifted from the superior group toward emphasis on the W . . . The M responses are more numerous . . . The emotional responses are more numerous . . ." The productivity, movement and colour responses are those which are much reduced in cases with severe cerebral involvement. The lower intellectual levels also seem to bring about the same result. These results are indirectly supported by Ross (1941) who found that none of his 34 superior normals gave 5 or more Piotrowski signs, by Ross *et al.* (1944) who found that their normal group with a probable I.Q. of over 120 gave the lowest "Disability Score" of all the five groups investigated and by Dorken *et al.* (1951) who assert that their own ratings are particularly sensitive to the lower levels of intelligence and to impairment.

Diers and Brown (1951) carried out a study to investigate the relationship of intelligence level to the incidence of Hughes's signs. A group of 36 hospital patients were given the Rorschach test and an intelligence test. The Rorschach records were then analysed for Hughes's signs of intracranial pathology. Twenty-five of these had a diagnosis of multiple-sclerosis, whilst the remaining 11 had non-neurological diagnoses. The multiple sclerotics were dichotomized on the basis of group mean I.Q. The lower group exhibited a statistically significant increase of Hughes's signs and a significantly higher weighted mean score. No significant difference was found between the lower I.Q. Multiple Sclerosis group and the control group. The authors suggest that, ". . . the Hughes's signs inadequately discriminate between patients of low original intellectual endowment".

Much the same conclusion can be drawn from the work of Neff and Lidz (1951). Three groups of normal subjects were studied. Thirty-two per cent. of this group were of superior intelligence, 38 per cent. average and the remaining 30 per cent. of inferior intelligence. Their results show that intelligence level has a strong effect on Rorschach productivity, both in terms of the absolute and relative magnitudes of the significant Rorschach factors. There was a sharp division as opposed to a gradual graduation between the superior and average groups, whilst there seemed little difference in the average and inferior groups.

Zangwill* writing on the Goldstein-Scheerer Tests says that some patients with diagnosed cerebral lesions can perform in an essentially normal way on these tests. He believes that this may be due to a high previous intellectual level or a restitution of cortical function, or a combination of both. He continues, "In view of the possible influence of previous intelligence level on test performance it would be most useful to have a suitable standardized series of abstraction tests of graded difficulty . . . *It is also possible that psychogenic disturbances in patients of low intelligence may lead to patterns of test performance easily confused with the actions of organic patients.*" These comments although applied specifically to the Goldstein-Scheerer tests do raise further the problem of the relationship of intelligence level to the incidence of Rorschach "organic" signs. It might be added that patients with cerebral lesions can perhaps behave

* Buros, Oscar: *The Third Mental Measurements Yearbook*, 1949.

in a "normal" way and deal at an abstract level because the particular lesion has no demonstrable effect on intelligence.

2. *If certain types and areas of organic brain damage do not result in intellectual impairment, and, if it is agreed that low or impaired intelligence contributes to an increased incidence of organic type records, then the percentage of misclassifications should increase and the validity of the signs decrease in the investigation of such cases.* Two cases in the present study are illustrative. Subject number 2 (Table VI) had a right temporal cerebral neoplasm, he was right handed and was subject to attacks of psychomotor epilepsy. Subject number 8 (Table VI) had a calcified glioma in the posterior part of the left temporal lobe. Subject number 2 showed no evidence of brain damage on testing with the Rorschach. Subject number 8 showed evidence of brain damage on each of the five sets of signs. Meyers and Yates (1954) have helped to throw considerable light on this anomaly. They discovered that subjects who were operated on (temporal lobectomy) for psychomotor epilepsy, and the operation was performed on the dominant hemisphere, showed slight intellectual impairment after the operation. For the same complaint, in the same cerebral location, only this time in the non-dominant hemisphere, there was no intellectual impairment. Our two cases are supportive. Subject No. 2 who was right handed, had a neoplasm in the right temporal lobe, did not show any intellectual impairment. None of the 5 sets of signs showed any evidence of brain damage. Subject No. 8 who was right handed and was operated on for a calcified glioma in the posterior part of the left temporal lobe showed a marked impairment. Each of the 5 sets of signs reflected the presence of brain damage. Whilst this evidence does not increase the validity of the signs it does at least explain in part the diagnostic misclassification of Subject No. 2.

It is also questionable to what extent lesions of the basal ganglia (Subject No. 9 Sydenham's Chorea) are expected to reflect organic patterns when indeed there is no impairment of intellectual functioning or is any expected.

In addition to further indicated studies on the relationship between different levels of intelligence in normal subjects and the incidence of Rorschach organic signs, these results further posit the necessity of discovering which areas of brain damage result in severe intellectual impairment and which areas show little though the size of the lesion may be the same. It also posits the necessity of discovering the differential impairment of intellectual functioning in the different "levels" of the brain. For example both Mettler (1949) and Zubin (1952) found that the frontal lobes could be interfered with in many ways without any deleterious effects provided the agranular tissue was left intact. It would seem important to investigate similar problems because if what "organic" signs are really measuring is intellectual impairment or the effect of low intelligence then any areas of brain damage or any levels of cortical dysfunction which do not become apparent in the form of intellectual impairment will not reveal an "organic" condition even though it does in fact exist (Subject No. 2, Table VI).

Unfortunately it is difficult at the present time to synthesize the results of intelligence testing related to lesions of different lobes and hemispheres. This prevents a more adequate appraisal of our brain damaged group on the same scale as subjects Nos. 2 and 8, where we had definite experimental evidence to explain both the validity of the signs for Subject No. 8 and the invalidity of the signs for Subject No. 2 (Meyers *et al.*, 1954). This deficiency points to the need for more carefully planned studies similar to that of Meyers *et al.* The present accumulation of evidence is somewhat confusing. To take for example work reported on the frontal lobe. Freeman (1941), Penfield *et al.* (1950), Partridge

(1950), Greenblatt *et al.* (1950) and Porteus (1950) all claim a reduction in intelligence after operation on the frontal lobes. German *et al.* (1934) found an intellectual defect following frontal lobectomy for glioma, Brickner (1934, 1939) an impairment following bilateral frontal lobectomy; Goldstein (1936, 1948), Nichols *et al.* (1940) and Goldstein *et al.* (1941), an impairment of abstract ability in lesions of the frontal lobe, and Rylander (1939) who found that the extent of the impairment depended on the amount of frontal tissue removed. Little evidence of difference was found between left and right sided lesions.

On the other hand Lidz (1939) found no change in the intelligence quotient after right frontal lobectomy, Penfield *et al.* (1934), Penfield *et al.* (1935) reporting on frontal lobectomy find little change in intellectual functioning, whilst Hebb (1939, 1941, 1945) found little evidence of intellectual impairment in a series of cases with unilateral and bilateral frontal ablations. Zubin (1952) summarizing the results of the Columbia-Greystone 1 Study (Mettler, 1949) says, "... On the basis of cytoarchitectonics alone, two divisions of the frontal cortex exist—granular and agranular. It has already been pointed out that the latter when injured produces definite deficiencies in intellect and behaviour. Otherwise no localization has been demonstrated for any function." On the other hand it is perhaps wise to bear Hebb's (1950) warning in mind. "It is still unjustified to conclude that intelligence is unaffected by frontal lobe damage. Pre- and post-operative comparisons in frontal lobotomy procedures are apt to show little apparent effect of the operation. But a pre-operative examination, in a patient whose behaviour and emotions are sufficiently deranged to justify lobotomy, is most unreliable as an index of the premorbid level of intelligence."

3. Before the relationship of intelligence, localized brain lesions and the incidence of Rorschach "organic" signs can be discovered, it is necessary:

- (a) To describe organic lesions more adequately. This deficiency prevents the comparison of appropriate units of behaviour and intelligence with cerebral structure. Halstead (1951) describes this difficulty thus, "It is probably safe to say that no brain lesion has ever been completely specified. To do so would require knowledge that simply is not yet available. Mapping of the lesion by histological techniques, usually possible only with lower animals, maps only a visible, structural feature of the lesion. Details of ultra-structure, metabolic aspects of synthesis of nucleo-proteins, altered circulatory dynamics due to such considerations as changes in vascularity or in sludging of the blood, specified chemical depletions or alterations associated with injury or removal of brain tissue, the temporal course of the lesion, and the extent of the personality trauma are all relevant but usually unknown factors. Until these matters can be taken into account, we cannot be certain that we are juxtaposing appropriate units of behaviour and structure."
- (b) It is necessary to find accurate pre-operative assessments of intelligence. This is so because pre-operative ratings in organics and psychotics, no matter how good the rapport, are always suspect. Although a considerable mass of evidence argues against any intellectual loss, impairment or deterioration following cerebral involvement of the frontal lobes, a report by Koskoff, Dennis, Lazovik and Wheeler (1942) argues for hesitancy in accepting it. In their group lobotomy was performed for the relief of intractable pain. A mean drop of 20·4 I.Q. points was observed. Similar results to these were reported by Yacorzynski, Boshes and Davis (1948). Although their patient was neurotic or psychotic exceptional co-operation was obtained. The

Stanford-Binet I.Q. dropped from 118 to 97. These results would seem to indicate that generally since pre-operative intellectual assessments are possibly too low because of the varying effects of the patient's personality and co-operation then the difference between pre- and post-operative test scores may not reflect a drop where one does actually exist.

- (c) Finally it is necessary to know the combined effect of the pre-morbid personality, intelligence and level of aspiration of brain damaged patients. Eysenck (1952) found that if a neurotic group is divided into the introverted (dysthymic) and extraverted (hysteric) patients then these two groups show large differences. For example his introvert group had high levels of aspiration and very markedly underestimate their past performances. The extraverts on the other hand had a low level of aspiration and showed no tendency to underestimate their past performances. Normals occupied an intermediary position. (Himmelweit, 1946; Eysenck, 1947; Miller, 1951.) It may follow from this that introverts are more likely to strive to overcome felt handicaps (e.g. intellectual impairment) and be unsatisfied with their attempts, whereas the extraverts (hysteric) group may give up easily in the face of a felt handicap. It is feasible that a marked dichotomy in productivity alone may exist between the two groups, even though the particular area of brain damage was the same for both groups. One possible ramification is that since the dysthymic group severely underestimate their past performances any of their reactions to the Rorschach test may give rise to serious doubts as to their adequacy. In this way they may show an increase in such responses as score heavily for organic brain damage, e.g. impotence and perplexity. The extraverts on the other hand with no tendency to underestimate the past perceptions may provide records devoid of these high scoring organic indices.

4. The different interpretations of the same Rorschach organic signs may in some cases lead to errors of classification. A relevant criticism of Piotrowski's (1937) signs is contained in Ross (1941).

5. The different degrees of rapport achieved by different examiners and the attitude of the subject being tested may seriously impair the validity of the test. Lord (1950) for example found that performance on the Rorschach varied significantly with good or bad rapport both due to administrative conditions and different examiners. A publication by the Army Air Forces (1949) also showed the influence of the examiner on the number of responses to the Rorschach Test. Luchins (1947) studied the influence on Rorschach productivity of situational and attitudinal factors. The research showed the influence of misunderstanding of directions and the subject's poor ideas of what was expected of him in the testing situation. Since Rorschach productivity has a definite bearing on the absolute and relative sizes of the significant Rorschach factors and since this productivity can be affected along the lines indicated by such as Lord (1950) and Luchins (1947), studies using organic patients and suitable controls under similar experimental conditions should be undertaken. In this way we may learn more about the distorting effects of these additional variables, with especial reference to organics and people of low intelligence.

PROBLEM II

Following the large number of misclassifications that occurred in the M.D. group, the almost complete absence of misclassifications in the superior normal groups, and results noted in the literature which substantiated these findings, a second problem was formulated. It was decided to investigate whether the

validity of the signs was increased and the percentage of misclassifications decreased when age and intelligence were taken into account in our normal and functional patients. No person of less than high average intelligence (I.Q. 100+), or more than 40 years of age was included, i.e. the matched group method for the normal and "functional" group was used. No person of more than 40 was included in an attempt to minimize the possible effects of cortical changes with age and any resulting intellectual deterioration or impairment, however mild.

RESULTS II

TABLE VII

The Effect on the Percentage of Misclassifications when I.Q. and Age are Controlled

	Piotrowski	Harrower- Erickson	Hughes	Ross <i>et al.</i>	Dorken <i>et al.</i>
Misclassifications normal/functional* uncontrolled (per cent.)	9.17	22.01	2.75	18.34	40.37
Misclassifications normal/functional controlled (per cent)	2.82	11.27	1.41	10.42	28.17

* The functionals include the neurotics, schizophrenics, psychopaths and idiopathic epileptics.

DISCUSSION

Although many variables were not controlled in this second investigation the large drops in percentage misclassifications would seem to add further proof to the distorting effects of low intelligence on the incidence of organic signs. The Piotrowski and Hughes signs seem the least affected by misclassifications in the normal and "functional" groups when age and intelligence are controlled.

SUMMARY AND CONCLUSIONS

The Rorschach protocols of 125 subjects were analysed and scored according to the signs of Piotrowski (1937), Harrower-Erickson (1940), Ross *et al.* (1944), Hughes (1948) and Dorken *et al.* (1951). The group comprised 13 normals of superior intelligence, 41 neurotics, 22 schizophrenics, 10 idiopathic epileptics, 12 psychopaths, 11 mental defectives and 16 organics.

The first problem was to note the validity and percentage of misclassifications occurring in each of these sets of signs in each of the diagnostic groups. There was no attempt to match the groups, as it was desired to make the selection under conditions which prevail in hospitals. All of the signs were found to be capable of varying degrees of validity, but the number of misclassifications was found to be too large. Several explanations for the inadequacy of the signs were put forward, notable amongst these was the effect of low intelligence. This factor, with age, was controlled in the second investigation. It was found to decrease the percentage of misclassifications in the normal and "functional" groups.

It is further suggested that not only does low intelligence have a distorting influence but certain areas of brain damage which do not result in intellectual impairment will increase the invalidity of the Rorschach "organic" signs. It also points to the fact that if certain areas of brain damage do not result in intellectual impairment, and if the incidence of Rorschach organic signs is proved to be heavily dependent on intellectual impairment, then the Rorschach test can never be used in the diagnosis of organic conditions in these areas.

It is also suggested that part of our difficulties occur because some Rorschach workers, whilst admitting the effects of low or impaired intelligence on Rorschach productivity, etc., look upon the "organic" records as reflections of personality change. This viewpoint appears wrong to the author because it necessarily precludes examination of cerebral localization and structure. Harrower-Erickson for example says, "Although widespread and diffuse cerebral damage of a more discrete type, such as is seen in many cases of focal epilepsy, need not give such a personality picture . . ." (1940b). Might it not also be suggested that the focal epileptics do not give, "such a personality picture", because the lesions do not impair intellectual function whilst "widespread and diffuse cerebral damage" does?

Several aspects of the pre-morbid personality are discussed in their relevance to the present problem. Level of aspiration seems in part at least an important variable to be taken into account in future investigations.

A plea is put forward for more integrated research to incorporate both the latest physiological findings on cerebral structure and psychological findings on the measurement of behaviour and intelligence. It is only in this way that exact experimental control can hope to correlate, "appropriate units of behaviour, intelligence and structure".

The necessity for good rapport between subject and examiner, the necessity of making sure that the subject understands what he is expected to do and the necessity for more exact definitions of the "organic" signs are suggested as further steps to reduce invalidity and the number of misclassifications.

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REFERENCES

- "Anglo-American Symposium on Psychosurgery, Neurophysiology and Physical Treatments in Psychiatry", *Proc. Roy. Soc. Med., Sect. Psychiatry*, 1949, Suppl. 42, Pp. 95.
- BRICKNER, R. M., *Res. Publ. Ass. Nerv. Ment. Dis.*, 1934, **13**, 259.
- Idem*, *Arch. Neurol. Psychiat.*, Chicago, 1939, **41**, 580.
- DIERS, W. C., and BROWN, C. C., *J. Consult. Psychol.*, 1951, **15**.
- DORKEN, H., and KRAL, V. A., *Amer. J. Psychiat.*, 1951, **108**, 2, No. 10.
- EYSENCK, H. J., *Dimensions of Personality*, 1947. London: Kegan Paul.
- Idem*, *The Scientific Study of Personality*, 1952. London: Routledge and Kegan Paul.
- GERMAN, W. J., and FOX, J. C., *Res. Publ. Ass. Nerv. Ment. Dis.*, 1934, **13**, 378.
- GOLDSTEIN, K., *J. Neurol. Psychopathol.*, 1936, **17**, 27.
- Idem*, *Language and Language Disturbances*, 1948. New York: Grune and Stratton.
- Idem* and SCHEERER, M., *Psychol. Man.*, 1941, No. 239.
- GREENBLATT, M., ARNOT, R., and SOLOMON, H. C., *Studies in Lobotomy*, 1950, Pp. 495. New York: Grune and Stratton.
- HALSTEAD, WARD C., "Brain and Intelligence" in *Cerebral Mechanisms in Behaviour, The Hixon Symposium*, 1951. New York: John Wiley & Sons, Inc.
- HARROWER-ERICKSON, M. R., *Arch. Neurol. Psychiat.*, 1940a, **43**, 859-890.
- Idem*, *ibid.*, 1940b, **43**, 1081-1107.
- HEBB, D. O., *J. Gen. Psychol.*, 1939, **21**, 73.
- Idem*, *ibid.*, 1941, **25**, 257.
- Idem*, *Arch. Neurol. Psychiat.*, Chicago, 1945, **54**, 10.
- Idem*, "Animal and Physiological Psychology", in *Annual Review of Psychol.*, 1950, **1**.
- HIMMELWEIT, H. T., *Brit. J. Psychol.*, 1946, **36**, 132-144.
- HUGHES, R. M., *J. Proj. Tech.*, 1948, **12**, 165-167.
- KLOPPER, B., and KELLEY, D. M., *The Rorschach Technique*, 1942. New York: World Book Co.
- KOSKOFF, Y. D., DENNIS, W., LAZOVIC, D., and WHEELER, E. T., *Research Publ. Assoc. Research Nervous Mental Disease*, 1942, **27**, 723-53.
- LIDZ, T., *J. Neurol. Psychiat.*, 1939, **2**, 211.
- LORD, EDITH E., *Psychological Monogr.*, 1950, **65**, 1-34.
- LUCHINS, A. S., *Amer. J. Psychiat.*, 1947, **103**, 780-784.
- MEITTLER, F. A., Ed., *Selective Partial Ablation of the Frontal Cortex*, 1949, Pp. 517. New York: Paul B. Holber.
- MEYERS, V., and YATES, A. J., 1954. To appear.
- MILLER, D. R., *J. Abnorm. Soc. Psychol.*, 1951, **46**, 378-387.
- NADEL, A., *Arch. Psychol.*, New York, 1938, **224**, 60.
- NEFF, W. S., and LIDZ, T., *J. Proj. Tech.*, 1951, **15**, No. 1, 45-57.
- NICHOLS, I. C., and HUNT, J. McV., *Amer. J. Psychiat.*, 1940, **96**, 1063.
- OBERHOLZER, E., "Zur Differentialdiagnose Psychischer Folgezustände nach Schädeltraumen Mittels des Rorschachschen Formdeuteversuchs", *Z. Ges. Neurol. Psychiat.*, 1931, **136**, 569-629.
- PARTRIDGE, M., *Prefrontal Leucotomy*, 1950, Pp. 496. Oxford: Blackwell Scientific Publications.
- PENFIELD, W., and EVANS, J., *Res. Publ. Ass. Nerv. Ment. Dis.*, 1934, **13**, 352.
- Idem*, *Brain*, 1935, **58**, 115.
- PENFIELD, W., and RASMUSSEN, T., *The Cerebral Cortex of Man*, 1950, Pp. 248. New York: The Macmillan Co.

- PIOTROWSKI, Z. A., *Rorschach Res. Exch.*, 1936 1937, **1**, 23-40. Also in *Kwart. Psychol.*, 1937, **9**, 29-41.
- Idem, *J. Nerv. Ment. Dis.*, 1937, **86**, 525-537.
- PORTEUS, S. D., *The Porteus Maze Test and Intelligence*, 1951, Pp. 194. Palo Alto. Calif., Pacific Books.
- RORSCHACH, H., *Psychodiagnostik: Methodik und Ergebnisse eines Wahrnehmungsdiagnostischen Experiments: Deutenlassen von Zufallsformen*. 1st ed., Ernst Bircher, Bern; 1921, Pp. 174. 2nd ed., Huber, Bern, 1932, Pp. 227. 3rd ed., Huber, Bern, 1937, Pp. 255. 4th ed., Huber, Bern, 1941, Pp. 277.
- ROSS, W. D., *J. Ment. Sci.*, 1941, **87**, 331-348.
- Idem and ROSS, S., *J. Proj. Tech. (R.R.E.)*, 1944, **8**.
- RYLANDER, G., *Acta. Psychiat. Neurol.*, 1939, Suppl. No. 20.
- U.S. Army Air Forces Aviation Psychology Program Research Report, J. P. Guildford, editor. Printed classification test. Report No. 5. Washington, D.C.: Government Printing Office, 1947, Chapter 24, Clinical Type Procedures.
- YACORZYNSKI, G. K., BOSHEB, B., and DAVIS, L., *Research Pubs. Assoc. Research Nervous Mental Disease*, 1948, **27**, 642-57.
- ZUBIN, J., "Abnormalities of Behaviour", in *Annual Review of Psychol.*, 1952, **3**.

A HIERARCHY OF STRESSORS

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It is established that healthy individuals and schizophrenics respond in different ways if subjected to stressors ("alarming stimuli") under seemingly identical conditions. It is also common knowledge that healthy individuals react differently under the impact of "alarming stimuli" than individuals already under stress, i.e. for instance, suffering from certain psychosomatic manifestations.

In the following we examine the two statements and offer a tentative explanation. Subsequently a concept is introduced in which stressors are quantified according to their effect.

In a recent paper (Fischer, 1953a), it was suggested that certain phases of the G(eneral) A(daptation) S(yndrome) (G.A.S.) of Selye seem to occur during certain stages of the schizophrenic process.

If this hypothesis is true, the diminished reactivity of schizophrenics towards further "alarming" i.e. stressful stimuli can readily be understood. Because of the presence in them of the G.A.S. they are *already under stress* and thus less responsive towards further stimuli (Fischer, 1953b).

In the meantime further experimental evidence to support this concept has been presented by Williams (1953) who concludes that "since the schizophrenic is already aroused, the emotional reaction to stress does not appear to be so great or so variable as in the normal". Some brilliant perceptual work by Wertheimer and Wertheimer also "fits in rather well" with our picture of schizophrenia. Additional physiological and biochemical data of Hoagland—Pincus *et al.* (1953), Lingjaerde (1953), Stevenson, Metcalfe and Hobbs (1953), Delay *et al.* (1953) also support the already-under-stress concept. Hoffer's atropine studies can also be interpreted as supporting evidence. He showed that schizophrenics do not experience the administration of 3 mgm. atropine as a stressor, contrary to normal controls who react with the sympathicotonic shock phase of the alarm reaction of the G.A.S. which is characterized among other symptoms by an elevation of the systolic blood pressure and a decrease in the eosinophil count. Schizophrenics, being already under stress, answer the 3 mg. atropine stressor only with a slight *decrease* of the systolic blood pressure and no change whatsoever in the differential blood count. Another piece of evidence: spectroscopic oximetry carried out during stress situations "showed significant changes interpreted as indicative of increased autonomic lability in the controls as contrasted with unmodified functioning in the schizophrenics" (Sloane and Doust, 1954).

Of course, the degree of diminished reactivity towards further alarming stimuli of an organism already-under-stress depends on the particular stage of the G.A.S. and the duration of that stage. Lucy's results can be regarded as quantitative measurements in this direction. He found that chronicity of the schizophrenic process, i.e., in our terms, the duration of the phase of resistance of the G.A.S., increases the diminished reactivity (tolerance) of the patients

against such a general stressor agent as histamine. The tolerance of chronic schizophrenics towards histamine seems to be roughly proportional to the chronicity of the process.

Moreover, it seems that established adaptive stress responses other than schizophrenia can also be included in the above concept. Funkenstein, for example, has shown that methacholine (Mecholyl), a drug which precipitated asthma only in asthmatic patients, produced severe asthmatic attacks only during non-stressful situations. If the same individuals were already-under-stress, this drug produced no asthma or only mild asthmatic attacks.

Another group of phenomena on the other hand seems to contradict the above concept. According to Rud (1953) "when schizophrenics are about to die from febrile* or other physical illnesses (stressors) it is a common occurrence that they recover complete lucidity of mind . . .",† i.e. they do not react to a stressor as being already-under-stress. Nolan Lewis also described recovery from schizophrenia after the impact of such a stressor as strangulation from attempted suicide. An observation pertinent to the above is made by Groen's report dealing with individuals with peptic ulcer, of whom "most of them lost the symptoms and manifestations of peptic ulcer during their harrowing experiences in a concentration camp, when none knew whether they would survive the day"; these individuals again did not react to the "alarming" stimuli of a concentration camp as being already-under-stress.

There is only an apparent contradiction between these two groups of data. In the one instance the organism-already-under-stress is hyporeactive toward "alarming" stimuli, i.e. it fails to alter its adaptive response elicited by the original stressor. In the second instance the organism-already-under-stress abandons its original adaptive response and adapts by reacting to the subsequent stressor.

This apparent contradiction can be resolved by introducing a concept in which stressors ("alarming" stimuli) are classified according to their capacity to threaten the various levels of organization of the organism. Such a concept implies that different adaptive answers are elicited if the organism is threatened by stressors directed towards more basic urges and needs than those perceived‡ as less vital to the organism's existence. Thus threats of *primary importance* elicit a new adaptive response, while less important "alarming" stimuli are disregarded if the organism is already under stress of similar importance. In physiological terms: being-already-under-stress interferes with the neuro-humoral mediation of another stressful situation (i.e. "alarming" stimuli) of similar importance and magnitude.

Hence we propose to assume that the organism adapts to stressors in a hierarchical selective manner. Those stressors "perceived" as most threatening to the organism's survival are given top priority to be dealt with.

* Buscaino's fever-therapy ("hyperpyretotherapy") is based on the observation that schizophrenics improve during the febrile stage of infectious diseases.

† A 350 year old literary account of this observation can be found in Cervantes' *Don Quixote*. This archetypically schizophrenic hero is "seiz'd" at the end of the book "with a violent Fever, that confined him to his Bed six Days" His friends are not a little surprised to hear him talk normally: "Don Quixote's Words put them all into such Admiration, that they stood gazing upon one another, they thought they had Reason to doubt of the Return of his Understanding, and yet they cou'd not help believing him. They were also apprehensive he was near the Point of Death, considering the sudden Recovery of his Intellects." The third and last verse of his epitaph reads:

"Nor has his Death the World deceiv'd
Less than his wondrous Life surpriz'd,
For if he like a Madman liv'd,
At least he like a Wise One dy'd."

‡ "perception" is used here rather in a bio-social sense.

The hierarchical order of stressors should not be looked upon as a static construction, since there is no static hierarchical order of needs and urges in an organism against which stressors may operate. Masserman's recently published example illustrates very clearly the importance of conditioning, for instance, as one of the determining factors in the "perception" (classification) of a need as a basic or less basic one. The particular historical time and cultural setting are among the factors influencing the individual's choice as to his consecutive order in a hierarchy of stressors.

However, there are some stress-situations which are rather universally perceived as life stressors of primary importance. We imply that (1) ulcers which are given up in a concentration camp, (2) schizophrenic symptomatology disappearing through the impact of febrile infectious disease, strangulation or the contemporary shock-treatments (Billet *et al.*, 1953; Piette and Grauwels, 1952; Abse, 1953; Kast and Zweibel, 1954), etc., are all examples of organisms adapting to a life stressor of primary importance, i.e. to a stressor threatening the survival of the organism.

The concept of a hierarchy of stressors is also helpful in suggesting an explanation as to why those treatments of schizophrenia are apparently the most successful which are perceived as life-stressors of primary importance by the patients. From this point of view the history of the treatment of schizophrenia is a history of applied life-stressors.

The diminished reactivity (raised tolerance) towards stress of the schizophrenic-already-under-stress was illustrated in the initial part of this paper by the quantitative results of Lucy. Chronicity of the schizophrenic process, i.e. duration of the phase of resistance of the G.A.S. was found to be roughly proportional with the increasing tolerance toward a general stressor. This means in other words that the ability to perceive a life-stressor of primary importance is steadily declining. We can illustrate such a rising threshold toward life-stressors of the chronic schizophrenic by statistics showing his well-known declining rate of recovery after any shock treatment as compared with that of early schizophrenics (Barrès *et al.*, 1953).

There are life stressors of primary importance which may be built up gradually from small stressors in a cumulative way, for instance repeated and extended periods of interrogation for political and/or criminological purposes. The adaptive pattern after such a life stressor will be a completely different one from that prior to it. Also, new adaptive patterns in the form of religious or political conversions (James, 1902; Sargant, 1951) are often preceded by life stressors of primary importance.

SUMMARY

The concept of a *hierarchy of stressors* is introduced. Such a concept explains the different adaptive answers elicited if an organism is threatened (1) by a life stressor of primary importance or (2) by "alarming" stimuli directed toward less basic urges and needs. Stressors of primary importance may establish new adaptive responses, while stressors perceived as less important are practically disregarded if the organism is already under stress of similar importance and magnitude.

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REFERENCES

- ABSE, D. W., *Quart. Rev. Psychiat. Neurol.*, 1953, **166**, 287.
 BARRÈS, P., EY, H., and LABOUCARIE, J., *Évol. Psychiat.*, 1953, **2**, 239.
 BILLET, J., LAFON, R., and BILLET, B., *Annales Méd.-Psychol.*, 1953, **111**, 289.
 BUSCAINO, V. M., "1st Congrès Mondial de Psychiat.", Paris 1950, *Comptes Rendus des Séances*, **4**, 254.

- DELAY, J., LAINE, B., *et al.*, *L'Encéphale*, 1953, **42**, 385.
- FISCHER, R. (a), *Monatsche. Psych. Neur.*, 1953, **126**, 315; *J. Nerv. Ment. Dis.*, 1954, **119**, 492.
- Idem* (b), *Science*, 1953, **118**, 409.
- FUNKENSTEIN, D. H., *J. of Allergy*, 1953, **24**, 11.
- GROEN, J., *see* Wolff, H. G., *Stress and Disease*, p. 119-20. Ch. C. Thomas Publ., Springfield, Illinois, U.S.A.
- HOAGLAND, H., PINCUS, G., *et al.*, *A.M.A. Arch. Neurol. and Psychiat.*, 1953, **69**, 470.
- HOFFER, A., *A.M.A. Arch. Neurol. and Psychiat.*, 1954, **71**, 80.
- JAMES, W., *The Varieties of Religious Experience*, p. 208. Modern Library, New York, 1902, Random House Publ.
- KAST, E., and ZWEIBEL, A., *Psychosomat. Med.*, 1954, **16**, 334.
- LEWIS, N. D. C., *Ment. Hyg.*, 1950, **34**, 569.
- LINGJAERDE, O., *Acta Psychiat. et Neurol. Scandinav. Suppl.* 80, 1953; *Arch. f. Psychiat. u. Z. Neurol.*, 1953, **191**, 114.
- LUCY, J., *A.M.A. Arch. Neurol. and Psychiat.*, 1954, **71**, 629.
- MASSERMAN, J. H., *L'Encéphale*, 1954, **43**, 1 (page 31).
- PIETTE, Y., and GRAUWELS, J., *Acta Neurol. Psychiat. Belg.*, 1952, p. 808.
- RUD, F., *J. Clin. Exper. Psychopathol.*, 1953, **14**, 1.
- SARGANT, W., *Brit. Med. Journal*, 1951, *ii*, 311.
- SELYE, H., *Stress, Acta Inc., Montreal*, 1950; *see* pp. 277-280.
- SLOANE, B., and DOUST, J. W. L., *J. Ment. Sci.*, 1954, **100**, 129.
- STEVENSON, J. A. F., METCALFE, E. V., and HOBBS, G. E., *A.M.A. Arch. Neurol. and Psychiat.*, 1953, **70**, 802.
- WERTHEIMER, M., and WERTHEIMER, N., *Psychol. Rev.*, 1954, **61**, 279, and personal communication.
- WILLIAMS, M., *Psychosomat. Med.*, 1953, **15**, 456.

DIAGNOSTIC PROBLEMS IN PRE-SENILE DEMENTIA ILLUSTRATED BY A CASE OF ALZHEIMER'S DISEASE PROVEN HISTOLOGICALLY DURING LIFE

By

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MALADJUSTMENT at work is not synonymous with sickness, but when a middle-aged man becomes grossly inefficient in a job at which he has previously excelled, the chances are that he is ill. This paper describes such a case, and the investigations that led to the diagnosis by cortical biopsy of Alzheimer's Disease. So far as is known, this is the first recorded instance in this country of Alzheimer's Disease being diagnosed histologically during life. Apart from its interest as a clinical curiosity, however, this case illustrates some practical problems often arising in the assessment of this type of patient, which can be as difficult and responsible a task as any that the psychiatrist has to undertake.

CASE HISTORY

This man was 51 when sent to the Psychiatric Out-patient Department of St. George's Hospital. The reason for referral (not fully conceded by the patient or his relatives) was gross failure in his job as Civil Service librarian, in spite of a long and admirable previous work record.

His father died of a stroke at 67 and his mother of heart disease at 54. One of his four siblings had a nervous breakdown of unknown type at the age of 21. The family history was otherwise negative.

The patient, a teetotaler, enjoyed good physical and mental health until the illness which brought him into hospital. He had a successful career as a librarian, and in 1949 began working in the Technical Library of a Government department, doing very well in the exacting work entailed.

In June 1951 he was transferred to similar work elsewhere and at once found difficulty in adapting to the change. He felt ill at ease and could not understand a cataloguing system that he had not used before. He blamed his difficulties on his colleagues, and in so doing was encouraged by his sisters, who from then on acted as increasingly formidable champions, seeking to right imagined wrongs against their brother. A few months later, he found himself making spelling mistakes, and realized that he was ill.

He became resentful, nervy and upset when given an adverse report at the end of 1951. In March 1952, he was put in a less responsible job, and thereafter became low-spirited and developed tremor, sweating of the hands, and later impairment of close vision, tiredness in the legs and a tendency to trip on kerbs. He came to the Out-patient Department in August.

Investigations

Examination in Out-patients. He was retarded and apparently depressed. He did badly at simple tests of concentration and memory, but was obviously distressed by the examination, and it was impossible to decide whether his poor performance was due to affective disturbance or intellectual deficit. He was admitted for investigation to the Atkinson Morley Hospital on 1 October, 1952.

Physical Examination. His blood pressure was 147/90 and the retinal vessels showed early sclerotic changes. His gait was slow and a little stiff, there was no hyperkinesia. Both arms were tremulous; and associated movements were seen at the shoulder girdle when he gripped with his hands. Tendon reflexes were brisk and symmetrical and the jaw jerk was also brisk. These abnormalities were all minimal.

Behaviour in Hospital. He was clumsy in dressing and forgetful in conversation. The depression which he showed on admission cleared within a week, but no real improvement occurred in his memory with the lifting of the affective disturbance. He was still able to retain only 5 digits forwards and 4 backwards, and failed at simple tests of concentration such as the serial subtraction of seven from 100.

Special Investigations. More elaborate psychometric tests gave results consistent with a diagnosis of dementia. Skull and chest X-rays and lumbar air-encephalogram were all normal, and there was no significant abnormality in the E.E.G. The cerebrospinal fluid contained ten red and fifteen white cells per cubic millimetre but was otherwise normal. There was a sustained rise in the erythrocyte sedimentation rate, this being on different occasions 20, 23, and 20 mm. (1st hour, Westergren).

Cortical Biopsy. This was carried out under local anaesthesia by Mr. Alistair Patterson, tissue being taken from the right posterior parietal region. It is worth noting that the patient had far less discomfort after this procedure than after pneumo-encephalography, which gave him several days intense nausea and headache.

Histological Findings. Professor Alfred Meyer reported: "Histological investigation shows a large number of senile plaques, Alzheimer's neuro-fibril change, proliferation of macroglia and excess of lipoids in nerve cells and glia. Diagnosis (in view of patient's age): Alzheimer's disease."

Progress

On discharge from hospital, the patient was improved only in his spirits. His relatives were told that his brain was irreversibly damaged, and that the future would bring mental and physical deterioration. It was hoped that this advice would spare them the effort and expense of negotiations seeking to prove that his ill-health was attributable to maltreatment by his colleagues, or to establish a claim for reinstatement. They continued to act on their emotionally charged preconceptions, however, and did not acknowledge the inevitability of his retirement on grounds of health until it was enforced by the authorities concerned.

The patient now spends most of his time in the garden, and when last visited in February 1954 was accepting his way of life with comparative contentment. He appeared socially well preserved and said that he was still driving his car. There was a relative increase of the tendon jerks on the left side of the body, and the blood pressure was 160/100, but he did not look wasted and there was otherwise no obvious physical change. He could still write clearly, but had some difficulty with visuo-spatial orientation, for example reversing east and west when asked to draw the points of the compass. He had nominal dysphasia, much more markedly than before. Psychometric tests showed a greater general deficit than in 1952. The E.S.R. had fallen to normal (8 mm. 1st hour).

DISCUSSION

The diagnosis of early dementia may be extremely difficult when there is overt affective disturbance, particularly under out-patient conditions. Depressive retardation may mimic impairment of performance due to intellectual loss, while organic lability of mood may superficially resemble depressive agitation. Patients with dementia or depression often react hysterically to the underlying illness, producing secondary symptoms which complicate the clinical picture and obscure the diagnosis.

The case described, which presented with depression, illustrates both the difficulty in diagnosis and the fact that admission to hospital may enable it to be solved within a week or two. During this period, full use should be made of ancillary staff. Nurses report on the patient's behaviour with special reference to variability of affect, since endogenously depressed patients are often worse in the mornings, whereas demented patients who are reactively depressed tend to be at their worst later in the day, when fatigued, or when any unusual effort is required of them. The occupational therapist, if psychiatrically insightful, can devise a diagnostic regime in her department and make a useful assessment of learning capacity, retentivity, rigidity, and manual dexterity. Admission to hospital also, of course, enables the psychiatrist and psychologist to make repeated observations under controlled conditions. The validity of psychometric tests in dementia is too large a question to be usefully discussed here.

Once the diagnosis of dementia is established, special physical investigations such as lumbar puncture, EEG, and air encephalography are indicated whenever there is any possibility of a treatable cause such as a tumour. All too often, these examinations give negative results, and the case is assigned to the diagnostic "rag-bag" of presenile dementia, any further differentiation being a matter of inaccurate guesswork. It is therefore satisfactory to be able to

report this case in which a firm diagnosis of Alzheimer's disease was established during life. Biopsy was carried out because of the particular importance for this patient of making as definite a diagnosis and prognosis as possible. The histological report provided a basis for warning his relatives of the nature of the malady, answering the question of whether his disability was attributable to the conditions of his work, and offering advice on his future mode of life.

It is not suggested that cortical biopsy should be carried out in all cases of presenile dementia. Most of these patients would not be helped in any way by having a piece of their brain removed and examined, in the present state of knowledge. However, where justified by the circumstances of individual cases such as the one described, histological studies are of potential value in research into the natural history of an obscure but very important group of diseases. The possible relationship of Alzheimer's disease to senile dementia (Newton, 1948) is one reason for studying the presenile dementias by all available means. Very little has been written about the use of biopsy in these conditions (Antoni 1950; Flugel, 1932; Green *et al.*, 1952). Polatin *et al.* (1948) described the diagnosis of Pick's disease by temporal lobe biopsy in two patients and drew attention to the need for histometabolic studies in such cases.

Certain features of Alzheimer's disease probably receive too much emphasis in the usual textbook descriptions. For example, restless and repetitive hyperactivity is given as a characteristic symptom, whereas Sjogren (1952) found that in 15 out of 18 cases lack of spontaneity rather than restlessness was the predominant feature in the early stages, and this was certainly the case with the patient whose illness forms the subject of this paper. Again, radiological contrast studies are alleged to be of great diagnostic value. In our early but proven case the air encephalogram was normal. Sjogren discounts the value of air encephalography in differential diagnosis of Pick's and Alzheimer's diseases, and Bull (1952) has pointed out some of the pitfalls in the interpretation of radiographs in cortical atrophy in general. A further point illustrated by our case is that focal neurological signs may be late in appearing.

A raised erythrocyte sedimentation rate has not been reported as characteristic of Alzheimer's disease, and its occurrence in this isolated case may be fortuitous. However, it is interesting that no other cause could be found for it, that there was a slight pleocytosis in the cerebrospinal fluid, and that eighteen months later, when the dementia appeared to be advancing less rapidly, the E.S.R. was normal. It is tempting to link these observations with the report (Rothschild and Kasanin, 1936) of a condition indistinguishable from Alzheimer's disease arising in the course of toxic confusional states, and to wonder if the degenerative changes in this disease may sometimes be the sequel of acute but unrecognized inflammatory changes in the central nervous system. However, there is no other available evidence to encourage this speculation and Sjogren believes that Alzheimer's disease is determined by multifactorial inheritance.

Finally, as to the validity of the diagnosis in this case, some of the pathological features of Alzheimer's disease can, of course, occur apart from dementia (Newton, 1948), but these particular tissue changes were so gross as to place the diagnosis beyond question when considered with the clinical findings and age of the patient. The prognostic significance of such changes, found at biopsy, can at present only be inferred from the retrospective review of cases diagnosed post mortem. In Sjogren's large series, he estimated that at the onset of symptoms the expectation of life was approximately half the normal for the

patient's age, but it would, of course, be fallacious to apply conclusions derived from material such as his to cases of the disease diagnosed *in vivo* without a good deal more knowledge of the natural history of this condition than we at present possess.

APPENDIX

Since this paper was written, it has not been possible to examine the patient again, because his relatives have objected to such a procedure. I am indebted to his family physician, Dr. R. W. Watts, for the information that the patient has shown no gross further deterioration in respect of his physical or mental condition up to 3 March, 1955. An interesting medico-legal problem had arisen, however, out of the patient's claim to have suffered in his health as the result of a head injury sustained while driving his car in August, 1954. The matter is *sub judice*, so it would be improper to make any comment here.

SUMMARY

The investigation of a middle-aged man presenting with symptoms of depression and impaired efficiency at work is described and discussed in relation to

- (i) The problems of assessing such patients, in general.
- (ii) The value of biopsy.
- (iii) The particular features of Alzheimer's disease found in this case, which was diagnosed after sixteen months' symptoms and has since been followed up over eighteen months.

BIBLIOGRAPHY

- ANTONI, *Act. Psych. et Neur. Scand. Supp.*, 1950, 74.
 FLUGEL, *Ergebn. d. inn. Med. u. Kinderh.*, 1932, **44**, 327.
 GREEN, M. A., *et al.*, *Dis. Nerv. Syst.*, 1952, Vol. XIII, No. 10.
 LINDGREN, *Act. Psych. et Neur. Scand. Supp.*, 1952, 82.
 MAYER-GROSS, *J. Ment. Sci.*, 1944, **90**, 316.
 MCMENEMY, *J. Neur. Psych.*, 1940, **3**, 211.
 NEWTON, *J. Ment. Sci.*, 1948, **94**, 395, 225.
 POLATIN, HOCH, HORWIZ and RORZIN, *Am. J. Psych.*, 1948, **105**, 96.
 ROTHSCHILD and KASANIN, *Arch. Neur. and Psych.*, Chicago, 1936, **36**, 293.
 SJOGREN, *Act. Psych. et Neur. Scand. Supp.*, 1952, 82.
 STENGEL, *J. Ment. Sci.*, 1943, **89**, 1.

MEPHENESIN (TOLSEROL) AND MEPHENESIN CARBAMATE IN SPASTIC CONDITIONS*

By

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MEPHENESIN is a muscle relaxant which acts mainly on the spinal cord but which also has a definite effect on the thalamus, the basal ganglia and the brain stem. It relaxes hypertonic muscles, without appreciably reducing motor power, and allays fear and tension.

A number of investigators have reported that the drug is effective by the oral route in disorders associated with skeletal muscle spasm. For example, Hermann and Smith (1951) observed marked benefit in 76·5 per cent. of 200 patients suffering from rheumatoid arthritis, fibrositis, bursitis and allied conditions, while Peckover (1953) has commented favourably on the results achieved in peri-arthritis and various forms of fibrositis. Nesbitt (1952 and 1953) used mephenesin and diathermy in muscle spasm involving the lumbo-sacral and sacro-iliac areas, trapezius and other regions and reported that the results were markedly superior to those obtained with diathermy and salicylates or placebos. Laurence (1952) found that in spastic paralysis, oral administration produced benefit in only two out of 27 cases, but good results have been reported in the treatment of spasticity of multiple sclerosis. Mephenesin has also been used successfully in the control of tetanus convulsions, alcoholism, anxiety states, premenstrual tension and other spastic and hyperkinetic conditions.

The main disadvantages of mephenesin are its brevity of action and the relatively large doses required to secure a satisfactory response. Animal experiments have indicated that a new derivative, mephenesin carbamate, may largely overcome these disadvantages and the present report relates to reports achieved with mephenesin and its carbamic acid ester supplied by E. R. Squibb and Sons, under the names "Tolserol" and "Tolserol Carbamate".

A PHARMACOLOGICAL NOTE ON MEPHENESIN AND MEPHENESIN CARBAMATE

Mephenesin is absorbed readily from the gastro-intestinal tract and it is conjugated and excreted rapidly. Clinical efficacy is therefore dependent on the administration of adequate doses at regular intervals. It is now generally agreed that the average dosage for an adult is one to three grammes, given four or five times daily. The toxicity of the drug by the oral route is very low, but mild nausea and transient vertigo may occur, especially if mephenesin is taken on an empty stomach. In order to minimize these side-effects, it is recommended that "Tolserol" treatment should be commenced with one gramme administered four times daily after meals or after taking a draught of milk or other liquid, and that this dose should be gradually increased until a satisfactory response is obtained.

Experimental data provided by E. R. Squibb and Sons indicate that the carbamic acid ester is more slowly absorbed than the parent compound following oral administration, but that the ester produces higher plasma levels and persists in the blood stream for longer periods. Analysis of blood samples also showed

* Read at a meeting of the North-West Metropolitan Region Mental Deficiency Society at St. Lawrence's Hospital, Caterham.

that the carbamate is not hydrolyzed during or after absorption. Berger (1952) has observed that the anticonvulsant activity of mephenesin carbamate, determined in mice after oral administration, is about twice that of the parent drug and other studies indicate that the ester has a longer duration of action than mephenesin.

In animals, the acute toxicity of the ester is not significantly different from that of "Tolserol", and in subacute and chronic toxicity tests, large doses of the carbamate did not affect good intake, growth or blood picture. When the compound was given prior to the ingestion of food, moderately high doses caused occasional transient paralysis and ataxia, but these effects did not appear when the drug was administered on a full stomach. Similarly, emesis sometimes occurred when the ester was given before food, but was infrequently encountered when it was administered after feeding. These observations suggest that, like mephenesin, "Tolserol Carbamate" should be taken after meals or after taking a draught of milk or other liquid. Studies in animals indicate that both drugs have a similar pharmacological action.

MATERIALS AND ARRANGEMENT OF TRIAL

For the purpose of comparing the effects of the two drugs, patients were divided into two groups, one being treated with mephenesin and the other with mephenesin carbamate. The former compound was supplied as "Tolserol" tablets of 0.5 grammes and the carbamic acid ester was provided as tablets of 0.5 grammes and as a 20 per cent. suspension.

As far as possible, the patients were paired on the basis of sex, age, body-weight and clinical condition and one member of each pair was admitted to the mephenesin-treated group and the other to the group treated with mephenesin carbamate.

Starting dose was one gramme four times daily in four-hourly intervals of either drug, increased to one and a half grammes after a few days. Although the manufacturers state that much larger doses can be taken without causing any serious or lasting harm, I did not find it necessary to go beyond one and a half grammes three or four times daily.

Of the twenty patients that were submitted to this combined medico-physiotherapy treatment:

1. Five are suffering from congenital hemiparesis with considerable crippling and wasting and severe spasticity of the affected limbs. All these five cases have, in addition, dysarthria of a greater or smaller degree.
2. Six patients suffer from congenital spastic diplegia or paraplegia, affecting the legs, some of them complicated by dysarthria.
3. In five cases there exists congenital spastic tetraplegia. In the majority of these five cases there is also more or less severe choreo-athetosis. They are all invalid-chair cases.
4. One is a case of inco-ordination of movements with some speech-impediment, and
5. The three remaining cases are choreo-athetotics with minor degrees of spasticity and some speech-impediment.

In all twenty cases, the physical disability had existed since birth, and more than half of them had had physiotherapy of long duration in the past without, however, showing any improvement with the exception of one patient who had progressed satisfactorily, if only slowly, with physiotherapy alone. The rate of progress has increased considerably since the start of the new treatment in this patient.

Twelve of the patients are between 11 and 20 years old, five between 21 and 30, and three between 31 and 40, the oldest being 40. It is understandable that, considering their relatively advanced ages and long-standing disability, dramatic changes for the better could hardly be expected in so short a time.

Two of the patients are feeble-minded, twelve are imbeciles of fairly high grade, and six are low-grade defectives. It was impossible to select only high-grade defectives, as the clinical condition of the patients in both groups had to be taken into consideration. But they were all very co-operative and carried out all instructions given to them.

I should mention also that three of the twenty patients are epileptics. Neither the frequency nor the severity of the epileptic fits was noticeably influenced by the intake of either of the two drugs.

Before this test-series was started, every patient was carefully examined by myself and by our remedial gymnast, Mr. C. R. Mitchell, M.S.R.G. The affected areas were thoroughly investigated, and notes were made about muscles or muscle groups in a state of spasticity, and about the range of movements, both active and passive, in each joint.

Physiotherapy was carried out three times weekly while the drugs were administered every day irrespective of physical treatment.

Progress reports were obtained at weekly intervals. The remedial gymnast was kept in ignorance as to which of the patients was treated with "Tolserol" and which with the carbamate derivative.

The investigations were started in September, 1953. After eight weeks, we were compelled to interrupt the administration of "Tolserol Carbamate" owing to lack of supplies. The parent drug was discontinued at the same time. Physiotherapy, however, was continued throughout the winter in all the patients under investigation. After an interval of nearly six months, a second supply of "Tolserol Carbamate" became available. This time, the carbamate derivative alone was used in all the patients treated with this drug previously, but also in some of the patients who had been under ordinary "Tolserol" treatment before. This second series has now lasted for over six weeks.

This paper will relate in the first place to the experience gained during the first trial but will also point out to what extent the cessation of the drug-intake for nearly six months and the renewed introduction of the drug have influenced the condition of our patients.

SIDE-EFFECTS

Of the twenty patients, ten had no side-effects at all.

1. One patient vomited once after the first intake of the increased dose, another twice. No further emesis or nausea were reported afterwards in these two or in any of the other patients.
2. One patient was reported to have perspired excessively during the early stages of the treatment, while another complained of considerable thirst. Both these side-effects disappeared, however, after three or four days.
3. One patient had a burning sensation in the legs approximately ten minutes after taking the drugs, during the first week. Another complained of a sharp pain in the head ten minutes after the intake of the tablets. The pain lasted approximately fifteen seconds, for three days running. When the dose of the drug was increased in this patient, she again complained of a sharp pain, this time, however, not in the head, but in the left pectoralis region, in the left upper arm and in the left thigh. These are her affected spastic areas. The pain started approximately ten minutes after she had taken the drugs

and lasted about a minute and a half. This pain, too, subsided after three days. Both these patients were treated with "Tolserol Carbamate".

4. Two patients felt rather hot and were reported to be very pale for ten minutes after the intake of "Tolserol Carbamate". These side-effects disappeared after a few days.
5. Two patients were slightly drowsy. This drowsiness, however, was never serious enough to interfere with their ordinary activities or with physiotherapy. Both these patients were treated with ordinary "Tolserol". One of the two, in addition, was slightly depressed. I mention this especially because in the regular reports which I received from our remedial gymnast, it was emphasized that quite a number of the patients became more alert under the influence of the drugs, especially of "Tolserol Carbamate". They were more cheerful and co-operative, brighter and not as withdrawn as before. Their working capacity in wards and occupation centres improved and they became more interested in their personal appearance. One of the patients who had been incontinent before, shows great improvement in this respect while the other patient became incontinent when treatment was started and remained incontinent for some weeks. Gradually, however, she improved and she is now able to control her bladder satisfactorily.

On the whole, it can be stated that the side-effects were neither persistent nor severe and were by far outweighed by the beneficial effects, especially where "Tolserol Carbamate" was used.

I was naturally interested to see whether the relaxation of muscular spasm will not be offset by some degree of loss of muscle power.

Of the twenty patients, muscle power was not at all adversely affected in sixteen cases. Two patients showed a small degree of loss of muscular strength during the early stages of treatment, and one when the dose of "Tolserol Carbamate" was increased. As soon as we returned to the initial dose, muscular power was restored to normal. A second attempt to increase the dose, was successful a short time afterwards.

In only one case was the loss of muscular power so pronounced that the patient lost complete control over her movements. In this case the treatment had to be abandoned which is all the more regretted as this patient had responded very well and the range of movements showed considerable improvement. I shall attempt to treat this patient with much smaller doses in the near future.

Of these four cases, three had been treated with ordinary "Tolserol" and only one with the carbamate derivative.

RESULTS OF TREATMENT

These may be best demonstrated by discussing the two groups separately. Attention will be paid to the achieved relaxation of contracted muscles, to increase of range of movement, to stabilization of formerly uncontrollable movements and posture, and to the speech-impediments in these patients.

A. Patients treated with "Tolserol"

Muscular relaxation was achieved in all but two patients suffering from one of the spastic paretic conditions mentioned before. This relaxation was quite pronounced in two of them, in the rest only moderate. Accordingly, the range of movement showed appreciable improvement in some, slight only in the other cases.

Patient E.F.P., aged 20. A low-grade feeble-minded with an I.Q. of 51. Family history unimportant. She is an epileptic and suffers from spastic paraplegia affecting both legs.

She has had a long-standing course of physiotherapy before this treatment was started.

Her range of movements: active:

Right knee: 2.10.53. 55 to 75 degrees=a range of 20 degrees.

28.10.53. 55 to 90 degrees=a range of 35 degrees.

This is an increase of 15 degrees equivalent to 75 per cent. in less than a month.

Left knee: 2.10.53. 47 to 75 degrees=a range of 28 degrees.

28.10.53. 45 to 85 degrees=a range of 40 degrees.

This is an increase of 12 degrees.

On 17.3.54, when she had been without drugs for more than three months, she not only maintained the range she had gained, but had improved on it.

Right knee: 40 to 100 degrees which is an increase of 25 degrees in range.

Left knee: 35 to 80 degrees, another increase of 10 degrees.

After the resumption of treatment with "Tolserol Carbamate", she is now able to put the whole foot on the ground when walking, which was quite impossible before, and she takes far longer strides.

Patient L.C., aged 20. A high-grade imbecile with an I.Q. of 45. She had an operation to her hamstrings at the orthopaedic hospital at the age of 18 months. She suffers from spastic paralysis of both legs. Has no grave deformities. She has had physiotherapy for 14 months before this treatment was started.

Range of movements: passive:

Left knee: 14.9.53. 5 to 90 degrees=a range of 85 degrees.

4.11.53. 0 to 130 degrees=a range of 130 degrees, equivalent to an increase of 35 degrees.

Right knee: 14.9.53. 5 to 105 degrees=a range of 100 degrees.

4.11.53. 0 to 120 degrees=a range of 120 degrees, a range increase of 20 degrees.

Unfortunately, this girl lost eventually control over her movements to such an extent that treatment had to be discontinued, at least for the time being. She had suffered in the past from cramps in both her legs affecting her especially at night and necessitating the administration of sedatives occasionally. These cramps had completely subsided when she was treated with "Tolserol", but started again a week after the discontinuation of the treatment.

In the other cases the improvement in the range of movements is well below the figures mentioned above.

In one of the patients suffering from spastic tetraplegia complicated by choreo-athetosis and dysarthria, the following improvement can be demonstrated:

Patient St.R. He is an invalid-chair case and, a year ago, was unable to control movements at all. He had physiotherapy treatment for quite a considerable time, and on 7.9.53, before "Tolserol" was started, he could roll over to prone lying but could not stay there or remove the arm from beneath the body. On 9.11.53, he can keep still in supine lying for 3 minutes, roll over to prone lying and remove the arm himself, also stay in this position without the gymnast having to help him at all.

A similar improvement was achieved in another case where, in addition, breathing is controlled much better than before.

Two patients suffering from choreo-athetosis with some slight degree of spasticity, treated in this group, have shown but little progress.

In some of the cases where speech is affected as well, the latter has shown a tendency to improve slightly. This was not so apparent in the early stages of the treatment but became more evident as treatment progressed. It was interesting to note that in the cases responding well with muscular relaxation and range of movements, there was also noticeable improvement of speech. In the choreo-athetotics a minor degree of steadying of movements and betterment of muscular co-ordination went parallel with only slight degree of improvement of speech.

B. Patients treated with "Tolserol Carbamate"

Markedly better all-round results were achieved in this group.

Patient J.W.C., aged 12. A medium-grade imbecile with an I.Q. of 33. Handicapped considerably by a speech-defect which has shown but little improvement with speech-therapy.

An illegitimate child who has had a fall at the age of 3 months. No family history available. Nothing is known about the whereabouts of the parents. Apart from his speech-impediment,

he suffers from left-sided spastic hemiparesis, some wasting of the left arm, crippling of the left hand and slight wasting of the left leg. In addition to speech-therapy, he has had a long spell of physiotherapy before being treated with "Tolserol Carbamate".

Range of movements:

Left elbow, passive: 23.9.53. 135 to 15 degrees = a range of 120 degrees.
 30.10.53. 140 to 0 degrees = an increase of 20 degrees range.
 active: 23.9.53. 120 to 50 degrees = a range of 70 degrees.
 30.10.53. 130 to 35 degrees = a range of 95 degrees and an increase of 25 degrees.

His speech shows marked improvement as well.

On 17.3.54 active 130 to 5 degrees which is a further increase of 30 degrees range.

On 1.6.54 passive supination to full range. He uses his hand far more than before, he walks better and kicks with both feet.

In another hemiparetic, muscular relaxation set in immediately after the start of treatment and the progress was so rapid that he now has full active flexion in his left elbow joint. In his case the range of movement has increased by 83 degrees in the course of six weeks. This patient now plays football and does not require any encouragement to use his paralysed arm or leg.

Patient S.B.C., aged 20. A medium-grade imbecile with an I.Q. of 33. She suffers from spastic diplegia with considerable deformity of both feet, adductor spasm, slight tremor and severe dysarthria. No improvement with physiotherapy in the past.

Range of movement:

Hip, passive abduction: 2.10.53. 45 degrees.
 2.11.53. 110 degrees, an increase of 65 degrees in the range of movement.

Flexion right: 2.10.53. 76 degrees.

2.11.53. 120 degrees, an increase of 54 degrees.

Flexion left: 2.10.53. 85 degrees range.

2.11.53. 120 degrees, an increase of 35 degrees.

Knees passive. Flexion right: 2.10.53. 85 degrees.

2.11.53. Full range.

Flexion left: Same as right.

This patient's progress was rapid. She has become more alert and cheerful, her speech is more distinct and spontaneous. She does not dribble now.

During the drug-free interval, she progressed to more advanced training and exercises. She continued to improve, and three weeks after the re-introduction of medical treatment, the passive hip-abduction shows a further increase of twenty degrees range.

Hip flexion passive: left 145 degrees, a further increase of 15 degrees, and right: full passive flexion.

Active: left 80 degrees range, a thing she even could not attempt before, and right 120 degrees. Both knees could only be moved passively before but show considerable active range now.

Remarkably good results were achieved in the following case.

Patient A.P., aged 40. A high-grade imbecile with an I.Q. of 42. Premature 7 months' birth. He is the last of 9 children. Spastic diplegia. Both feet considerably deformed. Scars in the region of both thighs following previous operations. He had had long periods of physiotherapy and massage without any satisfactory result.

Range of movement:

Hip abduction passive: 2.10.53. 25 degrees range.

30.10.53. 50 degrees range, an increase of 25 degrees equivalent to 100 per cent.

Left knee active: 2.10.53. 42 degrees range.

14.10.53. 50 degrees, and

3.11.53. 80 degrees, an increase of 38 degrees and nearly 100 per cent.

Right knee active: 2.10.53. 20 degrees range.

14.10.53. 25 degrees, and

30.10.53. 34 degrees, an increase of 14 degrees.

He had to be wheeled to and from the gymnasium. He is now, for the first time in his 40 years, able to walk back to the ward in his walking-aid. It takes him 5 minutes and 35 seconds, but is quite an achievement for him. The range of movements measured recently, shows an increase of 20 degrees in passive hip-abduction, and of 5 degrees in active hip-abduction.

Left knee active 85 degrees, an increase of 5 degrees.

Right knee active 53 degrees against 34 degrees on 30 October, an increase of 19 degrees.

Patient M.C.H., aged 17. Considerable choreo-athetosis with slight spasticity of limbs. Severe inco-ordination of all movements. At the first examination, this girl could not keep

still in any position. On 2 November she can keep still in prone lying for one minute. She can now turn from supine to prone lying without assistance and, what is more, stay there. She can also kneel for one minute on her own. In her case, the treatment has, so far, had a steadying effect on her posture and on her movements.

She became rather incontinent when treatment was started, and, for some time, the dose of "Tolserol Carbamate" had to be reduced. Gradually, however, she made a very good adjustment, and was incontinent only occasionally. During the drug-free interval, she continued to be much less athetoid, but more so than when under treatment. After the resumption of treatment, she again became incontinent, but this time she has got adjusted to the drug quicker than during the first course. She can now stand against the wall, can use a rowing machine, and walks up and down the exercise steps without help. At a recent visit by her parents, she got up from her chair and walked towards them unaided for the first time in her life.

In all the other cases similar, yet not so striking, results were achieved with the treatment with the carbamate derivative. In only one case was the treatment completely unsuccessful.

Patient H.J.T., aged 12. A rather thin and pale boy suffering from gross inco-ordination of muscular movements resulting, in addition to practically ataxic movements, in a serious speech-defect which makes it impossible to understand him. He grimaces a lot. There is a minor degree of muscular spasticity in many skeletal muscles. Slight improvement with speech-therapy in the past. Apart from becoming more co-operative and cheerful, neither his movements or posture, nor his speech were markedly influenced by the administration of "Tolserol Carbamate".

DISCUSSION

The number of patients treated with the two drugs is relatively small, the time of the combined physiotherapy and medical treatment rather short, especially as we have to deal with chronic cases of long duration. However, there is enough evidence of good progress to justify this preliminary report.

In considering the two groups with their identical physical but different medical treatment, it is quite obvious that the results achieved in the patients treated with "Tolserol Carbamate" are very much better than those in the "Tolserol"-treated group.

Muscular relaxation could easily be achieved with "Tolserol", but was gained more rapidly with "Tolserol Carbamate", bringing about a far wider range of movement which was maintained in some cases long after the discontinuation of the drug. Although the patients usually preferred the tablets, muscular relaxation was achieved in relatively shorter time when the liquid suspension was used.

Loss of muscular power was so minute and, if present, of so short duration that, in my opinion, this usually most serious side-effect can easily be avoided if correct dosage is administered. Patients react differently to the intake of either of these two drugs, and in some of them relatively small doses are sufficient to overcome the muscular spasm. Where a reduction of the initial dose is indicated, it will often be possible to increase again after a short interval at lower levels. All the other side-effects which have been studied most carefully, can easily be neglected, as they tend to disappear after the first few days of treatment. And emesis and nausea can be controlled without any difficulty by the timely administration of the drugs in relation to food.

A gratifying effect of "Tolserol Carbamate", in addition to muscular relaxation and widening of range of movement, both active and passive, is the steadying influence on posture and athetoid movements. Again, the relatively small number of cases under observation, makes it difficult to draw final conclusions. But it appears that under the influence of "Tolserol Carbamate" patients can hold out for remarkably long spells in certain positions without any inco-ordination of movement. In this respect, too, the derivative is far superior to the parent compound.

The speech-disturbances in a large number of our patients are due either to severe spasticity of the muscles which are concerned with the execution of speech movements or to inco-ordination of the movements in these muscles.

In at least five of the twenty cases speech has definitely improved. The articulation is clearer and easier, and the patients have not to struggle as they did before in order to make themselves understood. Here again the impression prevails that the improvement in the "Tolserol"-treated patients began late, was slow in progressing and tended to oscillate while in the patients treated with "Tolserol Carbamate" the first signs of improved speech appeared shortly after the start of the treatment, the progress was more rapid and maintained without the remissions noted in the former group. Long-standing treatment with this drug would, of course, greatly assist speech-therapists, and it would seem desirable that the effects of these drugs, especially of "Tolserol Carbamate", on speech-impediments of spastic and athetoid patients be investigated on a larger scale.

When I had to interrupt the medical treatment and to carry on with physiotherapy alone for a relatively long time, I was anxious to see whether some of the ground gained in the course of two months' combined therapy would not be lost. The fact that not only was there no regression but, with a few exceptions, some improvement could be registered, is very gratifying. It shows that, once muscular spasm has been overcome by these relaxants, physiotherapy or exercises may be quite sufficient for a prolonged continuation of treatment without the use of drugs.

Another factor which I consider to be important in the selection of patients for treatment is their age and the duration of the existing injury. In our material, we had to deal with chronic cases of long, in some of indeed very long duration. If relaxation of muscular contractions and, as a consequence, considerable improvement in the range of movements could be achieved in these chronic cases, I can imagine that treatment with "Tolserol Carbamate" would be much more effective if applied to children, who, however, should be old enough to be able to co-operate fully with the remedial gymnast.

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REFERENCES

- BERGER, F. M., *J. Pharm. and Expt. Therap.*, 1952, **104**, 468.
HERMANN, I. F., and SMITH, R. T., *Journal-Lancet*, 1951, **71**, 271.
LAURENCE, D. R., *Lancet*, 1952, *i*, 178.
NESBITT, W. R., *Indust. Med. and Surg.*, 1952, 21/12, 599.
Idem, *Clin. Med.*, 1953, **60**, 269.
PECKOVER, J. R. B., *Lancet*, 1953, *i*, 1105.

TREATMENT OF CHILDHOOD SCHIZOPHRENIA

By
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ONE and a half years after she had been excluded from school a little girl of six and a half years was being watched by me as she took her part in the school assembly and entered into the normal activities of the A stream of her class. Some two months later the head teacher telephoned us excitedly to say that this same child had put up her hand in the full school assembly and answered the question correctly. There is perhaps little remarkable in this until I add that this child, Gwen, in October, 1952, was diagnosed as a schizophrenic and has, with two others, been treated along the lines indicated in a previous paper.*

Treatment has been cumbersome and fraught with difficulty for it has been carried out on an outpatient basis, as there are no inpatient facilities. Only by a highly commendable co-operation between the physiotherapy department of a general hospital, the Child Guidance Clinic team, the head teacher and staffs of the infants' schools and the devoted mothers, was this treatment possible. But it has borne fruit. One child is returned to the normal population and two are on their way.

Because Gwen's case and progress appear to be typical, I thought it would be profitable to report it in detail with reference only to the other two cases now under treatment. Both Gwen and a boy of almost the same age, Alvin, are only children and were originally excluded from school because of bizarre and dangerous behaviour. Desmond, aged eight years, is the third in a family of four and has drifted at the edge of a class in which he has stayed for two years, achieving nothing but a reputation for quiet peculiarity. All have impressed me as having a latent intelligence at the higher end of the average scale, possibly even higher. This is borne out by Gwen's present achievements of keeping pace with her A stream and reading beyond her age group.

The parents of these children are interesting. Gwen's mother was a very odd woman with a one-track mind, an argumentative attitude and a rigid approach. She was very difficult to handle and all departments complained of her. Her attitude to her daughter was strict to harshness, and unloving. She was so ambitious for this child that she began instructing her at the age of two years and had never played with her: in fact, she censored me for playing. The father is a man who works long hours but in his rare spare time is interested in physical culture, especially swimming. Alvin's mother was a very quiet, extremely limited but not unintelligent woman. She did her duty admirably but almost like a machine. She was concerned about her child and unloving in her approach, not because she did not love, but because she did not know how to convey it. She had never played with her child: she did not know how to. The father, a good worker, is interested in physical culture to the extent of reading magazines on the subject. Desmond's mother manages her family well but mechanically and in a detached way. She is liked by all departments because she is never upset, always pleasant and co-operative. There is no warmth in her approach and sometimes when she is talking of Desmond I have

* "The Etiology of Schizophrenia in Childhood", *Journal of Mental Science*, Part I April, 1952.

the impression that only a voice and no person is talking to me. She does not play with her children: she has no time and seems unable to tune herself to a play spirit. But she recognizes the need for play and tries to encourage from the side. The father, a hard-working man, is scarcely in the family picture but does play with the children. He loves running and leaping with them. Formerly, before he became so overworked, he was an enthusiastic football player and his life is still more physically than spiritually orientated.

I have purposely used different tenses in describing these parents for with the two mothers whose children have been longest under treatment there has been a remarkable change. This cannot be attributed to direct treatment of the mother, for Gwen's mother proved unco-operative, apparently because of personality limitations, and Alvin's mother was seen by an untrained social worker. Yet both mothers have blossomed as their children became more normal, and Gwen's mother is now friendly and pleasant, humorous and no longer a source of complaint from school and other authorities. This would stress the importance of a factor often ignored, that not only does the environment affect and mould the child, but the child can also affect and mould, warp or beautify its environment.

Gwen had been turned out of a school almost as soon as she entered it because she was dangerous and excitable; she threw things about as a baby does from a pram, caught hold of hands and sucked them, squealed, laughed and called out for no apparent reason, spat and did not seem to understand reprimand or encouragement.

At the clinic she made no apparent contact and called the doctor who first examined her "Duck" in a vague way. Other speech was barely comprehensible to strangers. I found that she could play at a ten-month level of giving and dropping, but had none of the interest and delight in these games that a ten-months baby would have. She had a large vocabulary but applied the corruptly formed words indiscriminately to objects, and her speech generally was echolalic. She asked parrotlike questions, expecting no answer and interjecting them inconsequentially. She perseverated with certain questions in this high parrot voice, but she could be quiet and sit on her mother's lap like a two year old. When she was addressed directly she became aggressive and destructive. The only emotion she showed was screaming fear at the dog, whom she called "pussy", "dog" and "animal". The mother's behaviour was also extraordinary at this time. When I devoted my attention to the child the mother made a great fuss of the dog exhibitionistically and complained to the dog about being left out, trying especially to attract the child's attention.

After some trial and error I was able to make contact with this child through "Ring o' ring o' roses" and through crawling upstairs. She got very excited by the first game (which was new to her) and the second performance suited her better. This contact point was a most touching experience, for this bizarre automaton was expressing for the first time, the normal delight, enjoyment and co-operation of the level of the action. We had found her emotional base, somewhere between ten months and a year. Like a ten-months child she had a terror of being left alone in a room, of going through an aperture when the part beyond was not in full view; she had no appreciation of height, length, distance or the relation of herself in space. She had not the basics, therefore, for making relations between herself and others. Like the young toddler she referred to me as "the lady", and I was no different from the psychologist and the social worker.

Working on my previous hypothesis I arranged for her to have a course

of massage to the whole body, planned like the mother's drying operations on the young baby and the fondling of the limbs and body that most mothers give at that time. Later, because we noticed that she seemed not to register pain, I prescribed faradic stimulation to be applied in gentle doses to the arms and legs. The child enjoyed all this. We also gave her a course of play in the physiotherapy bath leading to swimming and this side was then taken over by the father at the normal swimming bath.

In the meantime at the clinic we taught Gwen the emotional responses appropriate to her actions. I climbed upstairs with her, expressing the excitement and effort that must be felt by every little person attempting this task. She grew venturesome and explored the next flight, but coming down presented a difficulty until we bumped down on our bottoms, counting to the rhyme "One, two, buckle my shoe". In this way she learnt to count accurately. It is obvious that successful learning is only possible when it is fixed by a degree of excitement, and in schizophrenics where sensation seems awry one may have to use nature's excitement foci, the mouth and the anus, to aid learning. Even as the normal baby appreciates its world by bringing it to the mouth, the schizophrenic can be taught to appreciate its world through the same oral (and in the older, the anal) door.

At this stage, when she would crawl quickly upstairs and look with normal pleasurable anticipation to see if I was following, I have noted in my case file her poor physical co-ordination, her echolalia, her two-year-old grammar with few pronouns (and those indiscriminately applied) and with references to herself in the third person, her impulsiveness and her perseveration. This last is something which can create great difficulty. These children seem unable to stop themselves; they have to be prevented by another and stronger human force even to the extent of being picked up and removed from the situation and held firmly until their reaction is over. They seem to require a sharper stimulus as if they cannot register the lesser more general or diffuse stimulus and they require firmer (but not harsher) restraint. The mother had unconsciously evolved the right way of managing this child, but as it was not coupled with warmth and play it did not help the child to mature.

We graduated to jumping downstairs. Jumping alone she did stiffly and without emotion, but jumping into my arms, because I could press excitement and pleasure into her, gave her a delightful experience. She had no idea of distance and height and, like the one-eyed, could not appreciate these qualities through vision. The limit of safety she readily appreciated was within reach of me. Anything beyond that was too high, too far. She learnt later to measure by her own reach.

Because of her corruption of pronouns and unsureness of herself, we turned the stairs game into hide and seek, playing "Where's Gwenny? There she is." The dog co-operated and was especially useful, for when her excitement grew to fear we could shut him away by closing a door and later go back to find him still there and not minding in the least. She could not practise this with humans for she could not bear to be parted by a door from the adult protection.

With remarkable rapidity she progressed, and this applies to the others under this combined treatment scheme. She learned shapes and objects through feeling them by painting them. She tried to learn the dog in the same way! She climbed and clambered and reached. She experimented with height, depth, light, shade (she painted all the windows to keep the sun away and make it dark). All the time she needed the adult to go with her to express the experienced sensation, hot, cold, nice, nasty, dirty, happy, sad, frightening, reassuring,

and she needed the adult to set the limit. She was always excessive (and this applies to all of the schizophrenics) and would have hurled herself down from the top of the stairs (which happens to most young stair climbers), out of the window, poked out the dog's eyes, flung hard objects on to people, had she not been restrained by the adult. It was considered important that she should experience minor forms of these excesses with some of the hurt, which had to be carefully gauged. She also required the adult to lead her on to new things and reassure her that her fears were groundless by actual demonstration.

As she developed in her concrete relationships she also experienced an erotic development. She had been automatic about the lavatory and had attended to herself untidily but satisfactorily, but now she developed emotional reactions and difficulties. She had been admitted to school for the first half of the morning, but she had to be excluded again because at one point she succeeded in locking the teacher in the lavatory and at another she deposited her faeces on the floor and demonstrated them to her classmates.

After a respite she returned to school and part of her physiotherapy (gymnastics and massage) was translated into ballet-dancing lessons under a teacher for normal children. Her time at school has been lengthened until she is now going up to the end of the first half of the afternoon. She has been included in a group for remedial play, for now that her concrete relations are fairly well established (pronouns and adverbs correctly used and limits recognized and accepted with little or no adverse reaction), she must be taught personal relations with her contemporaries.

This child is still a little odd but she would not be picked out as she was when first we knew her. Four months ago when I saw her she carried out the correct actions in assembly, but was not part of it, but two months ago she was part of it. Four months ago she did her class lessons at a desk on her own, detached but absorbed in her task. She listened to the teacher as well as did the others and responded. She lagged behind in motion work and did not show the enjoyment evinced by some of the others. Now she enjoys. She still treats other children as objects but she greets adults normally and has a very alive interest in them. Instead of being lost as she was a year ago, she is well orientated with regard to time, place and person.

It would appear from this and the other two cases that it is possible to undo the schizophrenic process in children. Their behaviour is bizarre, their ideas are distorted even to delusions (Desmond believed he would grow into a woman), because they are based on faulty experiences and concepts, based in turn on poor physical and concrete premises. It would appear that there is a level at which these children can react normally, but it is usually at the infantile stage. It is necessary to explore back through toddler games, behaviour and experiences to the infantile until a reality is reached which the child can appreciate. It is difficult to describe this point but there is no mistaking it. The child becomes real, a person, very small but a little human being, not an elaborate, bizarre mechanical doll. From this point the child must be educated to experience and express up through the toddler to his own level. I need hardly say that this treatment is exhausting for both therapist and child. For a long time fifteen-minute sessions may be ample, for the child is constantly at peak and the therapist must do everything at the child's level, but with feeling appropriate to the normal child's experience and supplying the fixing excitement to the patient as well. Everything, massage, learning and play, must be accompanied by excitement. The therapist must be actor and producer, example and instruction, and all must be both physically and emotionally experienced for so must

the child learn to do, and contrary to usual Child Guidance practice, there must be considerable physical contact between therapist and child.

Who is the appropriate therapist for the schizophrenic child? Because the child could be considered handicapped, spiritually retarded, and because the treatment is re-educational, I originally conceived this as the province of the psychologist. The intimate relationship between therapist and patient necessary for successful treatment has, however, impressed me with the need for the psychiatrist to be directly or indirectly responsible and for the therapist either to be a medically trained person or one who has been analysed and who will, if a lay person, work in full co-operation with the psychiatrist. The therapist becomes much more really the mother figure for this child than in any analytical situation because of the physical approach. Alvin even imitated his therapist's speech and his irritating parrot voice became modified to a pleasant childish reproduction of the cultured "mother" tongue. This maternal role is necessary for the therapist but the real mother-child relationship must be fostered and developed, although the temptation to steal the child is the greater because of the physical bond. For obvious reasons, moreover, it is necessary that this physically based treatment should be entrusted to the medical man, accustomed and disciplined, as he is, to an approach to the body which can be intimate.

This treatment is experimental but because of its encouraging results in three children I wished to report it so that other therapists may regard it critically while it is still in the plastic state. I had envisaged originally the need for inpatient treatment of these cases, but having seen the response in both mother and child, with the enriching of the relationship possible only when the two remain together, I feel that outpatient treatment would be the method of choice if all the forms of treatment, including schooling, could be gathered under one roof. School is most important, for we found that the normal discipline of class routine had a beneficial effect itself on personality development.

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TREATMENT OF MALADJUSTED CHILDREN IN HOSTELS

By

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DURING recent years a number of Local Education Authorities have opened Hostels for Maladjusted Children but few have been open long enough for any adequate review of their work to be undertaken, or for principles of working to be clearly formulated. Winnicott and Britton (1944, 1947) have discussed their work in Hostels for evacuated children during the War, and the Ministry of Health (1944) also reviewed their war-time experience in similar Hostels. Little however has been written on the work of Hostels for Maladjusted Children as part of the ordinary peace-time work of a Child Guidance Service. This paper reviews the work done during the five years 1946 to 1951 in two Hostels in a Midland City and comments on the experience gained. It is felt this may be of general clinical interest, and of value for comparison with observations being made in other areas. As part of the review a study has been made of 50 unselected children who, having been in the hostels, had been discharged during that period, and whose subsequent progress it has been possible to follow.

ORGANIZATION OF HOSTELS AND RELATIONSHIP TO CHILD GUIDANCE SERVICE

Each Hostel took boys up to school-leaving age, one having accommodation for 15 boys and the other having 6 to 8 boys who it was felt specially needed to be in a smaller group. While in Hostel the boys all attended the ordinary local school. The Hostels were situated within reasonable travelling distance of the Child Guidance Clinic, so that children could attend at the Clinic for regular individual treatment if needed, and so that Clinic Staff could visit the Hostels regularly, with the minimum interference to their work. The Consultant Psychiatrist paid regular visits to each Hostel once a fortnight. On these visits he did not interview the children but spent the time instead discussing the children with the Hostel Staff, and helping them to work out and understand the individual and group problems which they had encountered. It was also valuable to be present at activities such as parties, or group discussions, as well as sometimes being present at meal-times. Any child showing particular difficulty was given a special interview at the Clinic. Hostel Wardens were given full reports from the Clinic on children and home situations, so they felt they were taken into full confidence, and were part of the therapeutic team. The Psychiatric Social Worker who had worked with the family before admission, continued with the same case, and also visited the Hostels as frequently as possible, to discuss the children and the parents. Whenever individual treatment was indicated, the child came to the Clinic for this as psychotherapy was not attempted in the Hostels themselves. The Psychiatric Social Worker would then act as the liaison between the therapist and the Hostel Staff, much as she would with a parent. It was found that this was very necessary, as Hostel Staff, in spite of their training and experience, still found their own emotional reactions aroused when a child was in a treatment situation, and a child would tend to

play off the therapist against the Hostel Staff unless this close liaison of understanding was kept. The author's impression is that the response to psychotherapy is disappointing while a child is in the Hostel, and not in contact with day to day emotional reactions at home, and that, on the whole, treatment is best approached through the group relationships, tensions and reactions in the Hostel itself, especially if the Hostel Staff are themselves skilled in handling these things.

In order to keep a close liaison between Hostel and Child Guidance Staff, a monthly group was held in which the Wardens, Matrons and Assistants of the Hostels and all the Staff of the Child Guidance Clinic joined. The discussions were focussed on problems which Hostel Staff themselves brought up from current day to day experience. These were dealt with from the aspects of tensions and anxieties aroused in themselves, and how to deal with problems in the Hostel group itself. Not only was this found to be most valuable in the further training of Hostel Staff in acquiring insight and understanding, but it also helped Clinic Staff to appreciate more clearly the strain of actually living with mal-adjusted children. Hostel Staff problems became better understood, and we avoided our own identification with the child from becoming so strong that it impaired Clinic-Hostel relationships. The technique we developed seems to be very similar to the work done by the Lasker Child Guidance Centre of Hadassah in Palestine (Irvine, 1951).

The general organization of the Hostels, the activities and discipline, were left entirely to the Warden and Matron of the Hostel, and Clinic Staff did not interfere in any way. All were ready to discuss these matters if asked, but kept it on a level of discussion, avoiding giving direct advice, so that Wardens worked out their own methods in the light of experience and the particular situation presenting.

CRITERIA FOR SELECTION OF CHILDREN FOR ADMISSION

No child was admitted to a Hostel who could possibly be helped in any other way. As originally pointed out by Healy and Bronner (1929) and emphasized by Bowlby (1951), removal from home, for whatever reason, should be regarded as a last resort to be undertaken only when it is absolutely impossible for the necessary readjustment to be achieved otherwise.

Our cases were only admitted on the recommendation of the Psychiatrist, and this was based upon the usual investigations by the Child Guidance team and case discussion. The Hostel Warden was also consulted before an admission was arranged, as it was found that the suitability of a child for admission depended upon the group situation in the Hostel at that particular time. Distribution of age-range, type of problem or behaviour, and intelligence level, were found to need consideration in relation to other children at present in the Hostel, so as to keep a suitable group balance, and a child who would be quite suitable at one time, might be quite unsuitable at another. Similarly the Warden was consulted about spacing of new admissions, so that one child had had a chance to settle into the group before another was admitted. Criteria for admission was usually based upon the impossibility of providing treatment in any other way. This usually meant because the parents were too entangled emotionally in the situation for out-patient reorientating of attitudes. The most suitable cases were those where it was felt that a break would make it easier for the Psychiatric Social Worker to gain the Mother's co-operation, and bring about a change in attitude. In other cases, there was a home situation which was unalterable and to which the child could not adjust himself. If he could be

helped to a more stable and a more detached attitude, it was felt he would be able to make a new adjustment. Occasionally it was used to help in the removal of a symptom which had a particularly irritant or disturbing reaction on the particular parent, so that out-patient treatment could be continued later without the handicap of all the parent's attention focussing on this symptom instead of on the more general basic problem (e.g. bed rocking, faecal incontinence, truanting, wandering). In some instances, behaviour was such that although home attitudes were reasonable, neighbourhood or school attitudes were such that the behaviour could not be tolerated, and so an aggravating situation unamenable to treatment was obstructing progress. Lastly, Hostel admission was occasionally used for children living in an isolated country area where attendance for out-patient treatment was impossible, but by living in a Hostel this could be provided. It will be noted that no reference has been made to material conditions of the home, or to any other unsatisfactory home conditions, e.g. cruelty, neglect, etc., which are so often taken to be reasons why removal from home is a necessity. The view was taken that any child who needed to be dealt with as a Care and Protection problem should be dealt with under the provisions of the Children's Act. Such children can be helped just as well in a really well-run Children's Home, with Child Guidance help, and need not take up a place in a Hostel for Maladjusted Children, for whom no other type of residential placement is available. Occasionally, the emotional disturbance is of such a kind that it is impossible for a child to be properly helped in a Children's Home—a Hostel for Maladjusted Children may then be able to help, but with improvements in the experience and training of Children's Home Staff, this should become less and less necessary. The very severely disturbed children will then be similar to those who cannot be helped by a Hostel either, and who will need placement in a Residential School where education, care and treatment can all come under the same plan and personnel.

In every case there was a long-term plan. We either continued to work with the home as well as the child in anticipation of new relationships being established, or alternatively, we were preparing the child for a new foster home, in which case the legal action necessary for the child coming into care would be taken before admission, and not left till later, as the need might then be more difficult to establish.

PREPARATION FOR ADMISSION

Recommendation for admission followed considerable investigation at the Child Guidance Clinic. Occasionally, right from the first diagnostic interview, it was clear that admission would be necessary. However urgently this had to be arranged, both child and parent were carefully prepared. The better the child and parent were known to the Clinic, and the better the relationship established, the easier and more satisfactory this was. The parent was helped to realize that admission was a form of treatment, and was not a punitive measure. The child was not being "sent away", it was not for "training" any more than it was for punishment, it was a form of treatment. The parents were given, if possible, the opportunity of seeing the Hostel and meeting the Staff first, if they had any anxieties. Care was taken not to over-persuade them, especially at the height of an emotional crisis. Similarly, the whole thing was openly discussed with the child by a worker with whom he was already familiar. He was told about the Hostel, where it was and what happened there. It was presented as a place he would like and where he would be helped with regard to his particular symptoms. He was never left in any doubt about why he was going, and it was

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made clear that it was not because his parents did not love him or did not want him. Sometimes it was found advisable to discuss the whole matter with child and parent together—both then knew what had been said to the other, and misunderstandings were avoided.

REACTIONS OF CHILDREN ON ADMISSION

The majority of children on admission went through a period of "mourning", however well the preparation had been done, and whatever the parents' attitudes were. The degree to which this was shown and the form it took depended not only on the child, but on the Hostel staff. A period of mild, normal depression seemed to be the most common and the most easily adjusted. Other children showed a mild hypomanic defence in which they were talkative, excessively pleased with themselves, and extravagant in their praise of the Hostel, and how wonderful it was. This type of reaction often led to much more unsettled reactions later. Sometimes this reaction occurred because of the Staff's inability to tolerate the normal mourning, feeling depression to be a reflection on themselves, and so jollying the children out of it in an artificial way. It was found to be therapeutically necessary to let the child know that his depression was accepted. A relationship was observed between the degree of "mourning" shown and the degree of rejection consciously or unconsciously experienced in his own home. The greater the degree of conscious rejection previously experienced, the less need there seemed to be for mourning after separation. This came to be regarded as an artificially easy settling which meant that considerable work would be necessary to build up adequate child-parent relationships again. These reactions merged into the deceptive short phase of good behaviour described by Winnicott and Britton (1944).

Once this preliminary phase was over, the child passed on to test out the Hostel and his feelings of security there. Our experience confirmed the observation of Winnicott and Britton (1944) that "most of the time the child is content to let another child do the testing for him . . . Always somebody has to be a nuisance. Often one of the Staff will say, 'we'd be all right if it weren't for Tommy', but in point of fact, the others can only be 'all right' because Tommy is being a nuisance, and is proving to them that the Hostel can stand up to Tommy's testing, and could therefore stand up to their own."

CONTACT WITH PARENTS WHILE IN HOSTEL

As the purpose was to restore disturbed relationships between the child and his own family, the policy adopted was that contact between child and home must be kept up from the beginning. Parents were allowed to visit and take children out at the discretion of the Warden, asking the psychiatrist's advice in any case of doubt, especially about first visits. A day and an occasional week-end home were arranged as they seemed to be therapeutically beneficial. Holidays, usually one to two weeks, were arranged at Summer, Christmas and Easter, but the length was kept elastic and fitted to the needs of each child and home, rather than to administrative convenience. It was recognized that visits home often had a disturbing effect on the child, and this was at times difficult for Staff to tolerate, but they came to agree with the Clinic Staff that these disturbances and the subsequent handling of them were essential if personality development was to take place and to avoid problems from merely becoming "encapsulated" while in a neutral environment, and so present merely a pseudo-improvement. The aim was to get a graded increase of time which child and parent could spend together without unduly straining the new degree of relation-

ship which had so far been built up. The policy was kept as elastic as possible—it was found best for some children to be visited or to have a weekend home very soon after admission. Others needed a relatively long time before it was felt this could be undertaken without damaging the future potential relationship. This irregular method, of course, sometimes led to grumbling, dissatisfaction or misunderstanding in other children. This was dealt with as it arose by the Hostel Staff, as a group tension. It was found to be beneficial to a child's own improvement, to be able to understand and adjust to the specific needs of another child.

WORK DONE WITH PARENTS

Throughout a child's stay in Hostel, the Psychiatric Social Worker who had previously been working on the case continued to work with the parents. The practical difficulties and the pressure of work prevented this from being anything like as intensive as was felt to be necessary. Nevertheless, it was found that even relatively infrequent contact could do much more than might have been anticipated. This was particularly so when the Wardens themselves were able to supplement the work with the parents. It helped parents very considerably, especially with their guilt feelings, to find that Hostel Staff were not critical or condescending towards them. Care was taken to help the parent not to feel a failure because the child had had to "go away", nor to feel that treatment was taken out of their hands and was something which was going to be done for them. We tried to keep before them all the time, the idea that the therapeutic task was a corporate one and one in which they had an important part to play. Similarly for parents to realize that their child was liked and accepted by the Staff and not regarded as a "bad lad" or a disgrace to the parents, helped in infiltrating new attitudes. However good the Wardens may be, however, tensions between them and parents are bound to arise. It is here that the real skill of the Psychiatric Social Worker is called out. Reference has been made to the emotional repercussions of admission to Hostel upon the child, but the corresponding repercussions on the parents must also be borne in mind. As the child begins to improve the parents need help in adjusting to the changes in the child and need to work out how they can best fulfil their new parental role. The difficulties which may arise, and the skill and insight needed to deal with them, have been well brought out by Robinson (1947). The parent must always be kept feeling that she is still responsible for her child, and things have not just been taken out of her hands or are now someone else's problem.

DISCHARGE

Preparations for discharge and choice of the best possible time for child and parent for this to take place need just as careful consideration as preparation for admission. In particular, we must assess very carefully the meaning behind a parent's request to have a child home. Many factors may influence a parent's request to have a child home again—it may be, "I've had a good rest, therefore I can try and cope with him again"—or it may be that she cannot stand the taunts of other relatives about having "got rid of him". It may be that she has forgotten just how difficult the situation was before, or a demand may be made to have an adolescent girl back because she could be useful at home. Unless the request is based on a true realization of improved relationships, we should be careful. In particular, we should be wary when the request is just an expression of guilt—if so it may need treatment rather than agreement. We must also beware of our own emotional involvement. It is only too easy

to agree to a premature discharge, when the parents are requesting it and we know we have several urgent cases requiring admission. A premature discharge for such administrative convenience, not linked with clinical readiness for leaving the Hostel, frequently leads to a disappointing result.

After discharge, all cases were followed up both at the Clinic and at home, as far as was practicable.

FOLLOW-UP STUDY

A follow-up study was made of fifty unselected boys who were consecutively discharged from the Hostel between 1946 and 1951. Follow-up was from 1-3 years after discharge.

These figures do not warrant any detailed statistical analysis. Not only are the numbers too small, but there were too many other inconsistent factors. There were changes in Hostel Staff, the pressure of other work with which Clinic Staff had to contend varied considerably, there were changes of administrators, and other factors which made a Hostel a good therapeutic unit at one time, only mediocre at another time. The facts of the follow-up are given, bearing in mind that they have to be balanced against these other factors.

In estimating adjustment it was decided to classify as "Satisfactory" those boys who were behaving normally in Hostel and on holidays at home, who had shown personality maturation and who had attained a readjustment of relationships with their own family. Where the boy had improved in Hostel and on holidays but had not shown sufficient personality maturation or had not attained a readjustment in family relationships, he was classified as "partial improvement" as it was considered doubtful whether the improvement would be maintained after discharge. Where behaviour and reaction in Hostel and on holidays was still difficult he was classified as "unsatisfactory".

Estimate of Child on Discharge

Satisfactory	..	..	..	..	..	..	13 boys (26 per cent.)
Partial Improvement	..	..	..	..	..	..	26 boys (52 per cent.)
Unsatisfactory	..	..	..	..	..	..	11 boys (22 per cent.)

Thus 39 boys (78 per cent.) had improved on discharge though there was doubt how long this would last in some cases.

Estimate of Child on Follow-up

Satisfactory	..	..	..	..	..	..	20 boys (40 per cent.)
Partial Improvement maintained	..	..	..	..	..	..	16 boys (32 per cent.)
Unsatisfactory	..	..	..	..	..	..	14 boys (26 per cent.)

Thus on the "partial improvement" group seven boys had made a better adjustment than had been estimated whereas three had not maintained the degree of improvement shown on discharge.

Length of Stay in Hostel related to Follow-up

Period in Hostel						Number of Boys	Unsatisfactory at Follow-up
3-6 months	..	..	..	..	..	8	4
6-12 months	..	..	..	..	..	14	7
1-2 years	..	..	..	..	..	18	2
2-3 years	..	..	..	..	..	8	1
Over 3 years	..	..	..	..	..	2	1

Thus more than half the unsatisfactory cases were in Hostel less than 12 months.

Intelligence

	I.Q.					Number of Boys	Unsatisfactory at Follow-up
70-75 ..	..	..	..	..	..	3	3
75-80 ..	..	..	..	..	..	5	4
80-90 ..	..	..	..	..	..	10	2
90-100 ..	..	..	..	..	..	20	4
100-110 ..	..	..	..	..	..	8	1
110-120 ..	..	..	..	..	..	1	0
120+ ..	..	..	..	..	..	3	0

It was found that those with Intelligence Quotients under 80 did not respond well in Hostel, and did better placed residentially as Educationally Sub-Normal. They were also felt to hold back the activities of others in Hostel. This may be associated with their still having had to attend ordinary schools, as there were no special educational facilities available at the schools attended. Subsequent experience showed such children did better in Hostel when a special class was available. Hostels, therefore, should be located if possible where special classes for Educationally Sub-Normal children are available in the schools attended. This is important when the low educational level of the more intelligent maladjusted children is also borne in mind.

Estimate of Home on Admission

				Satisfactory	Poor	Very Bad
Material Conditions ..	..	..	..	29	11	10
Emotional Conditions ..	..	..	..	2	20	28

The Psychiatric Social Worker did regular work with the parents of 7 boys and kept a less constant contact with 35 homes. In the 8 homes where no psychiatric social work was possible, 2 were children from Children's Homes and these were satisfactory on follow-up. Of the rest, 3 were unsatisfactory, and 2 doubtful on follow-up. Only one case did well on follow-up where no work had been done by the Psychiatric Social Worker. This was a boy who lived in an outlying village and psychiatric social work contact proved impossible. The Warden, however, helped the father very considerably when he visited the Hostel, and they kept in contact with the boy after he left and he went back for several weekend holidays.

Parents' Response to Psychiatric Social Work

Satisfactory ..	..	..	..	..	..	9 homes (18 per cent.)
Partial Improvement ..	..	..	..	..	..	13 homes (26 per cent.)
Unsatisfactory ..	..	..	..	..	..	20 homes (40 per cent.)
No Psychiatric Social Work possible ..	..	..	..	..	..	8 homes

Analysis of Failures

It was decided that an attempt should be made to estimate the reasons for failure in the 14 boys who were unsatisfactory on follow-up. The Psychiatrist, Psychiatric Social Worker and Hostel Staff consulted together about the boys and their families. In three cases it was considered that failure was because no work was possible in the home, which remained unsatisfactory. In another six cases the Psychiatric Social Worker worked with the home but was unable to get any response, and the unsatisfactory home situation was considered to be the main reason for failure. Three of the failures were removed by the parents prematurely against advice. One family moved from the district and insisted on

taking the boy with them and psychotherapy, as well as his stay in Hostel, was interrupted. Although he was behaving satisfactorily in Hostel relapse was expected. The final failure was an adolescent who was admitted at age 14 and was only able to stay in Hostel 10 months before leaving school. He failed to stabilize in spite of psychotherapy and work with the family, which were continued after leaving Hostel.

It is important to notice that the children who showed success on follow-up are twice as many as the homes that showed satisfactory improvement. This suggests that we need not be despondent when we find homes that cannot be improved to make a satisfactory emotional environment. So often one hears even Clinic Staff say, rather hopelessly, "Oh, he's all right in Hostel, but how can he possibly keep all right going back to a home like that?" It was found, particularly with older children, that they can be helped to adjust to even unsatisfactory home conditions. We have to adopt however, a definite specific technique of helping the child to come to a more objective view of home, admit and face the defects, express hostility, and then come to an understanding of the parents' own limitations and shortcomings as the outcome of the difficult childhood they themselves had. The child can often grasp this, having himself had first-hand experience of the way in which difficult home situations can create emotional problems and reactions. The boy or girl can then return as an understanding and helpful member of the family, instead of an irritant.

DISCUSSION

Treatment in Hostel is not primarily a form of "training"—if it is, then it is failing in its primary purpose. The child may acquire good training while in Hostel, but this is by the way and will not in itself lead to ultimate success. The aim should be to restore disturbed relationship between child and parents, or in more severe cases to help to develop the capacity to make relationships before building them up between the child and his own family. These more severe cases must of necessity be a long term project.

Improved relationships were considered to be due to the following factors:

- (1) As the child experiences a more bland reaction to his own emotional reactions there comes a diminution of playing up and attention getting. If the parent can be helped to continue this less emotionally toned reaction, the old vicious circle of child-parent antagonism becomes broken.
- (2) When the child begins to feel he is accepted for himself as he is, then there is an increase in his own self-value, and an increase in his basic self-confidence and security. So he is able to be himself without the compulsion to seek the limelight, or to show off by over-compensating or provocative behaviour.
- (3) Sometimes the discovery of new interests, abilities or potentialities may not only increase his own confidence, but may bring about an easier acceptance at home—sometimes even a feeling of pride in the child, especially when he was previously undervalued by the whole family.
- (4) The child has had the opportunity to express and work through his neurosis, either in the group situation of the Hostel or during individual psychotherapy while living in an emotionally neutral atmosphere which is not entangled with it. Guilt is relieved and maturity becomes possible. When hostile impulses have been acted out and the testing of parent figures has been done with the Hostel Staff, it becomes easier for good relationships to be established with the real parents.
- (5) While the child and parent are not living together, each gets a re-grouping of

ideas about the other, and the establishment of a new relationship by the skilful handling of this at the right phases becomes possible. It is in this group that the work done by the Psychiatric Social Workers and Wardens with the parents becomes most important.

Rarely does one factor work alone, and in most cases of continued success, all these factors come in to some extent.

SUMMARY

The organization of a Hostel for Maladjusted Children in a Midland City is described.

Criteria for selection, preparation for admission, and reactions of children and parents during treatment are discussed.

A follow-up study is made of 50 unselected consecutive discharges and reason for failure is considered.

The theoretical reasons for improvement and follow-up success are evaluated.

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REFERENCES

- BOWLBY, J., *Maternal Care and Mental Health*, 1951. World Health Organization, Geneva.
IRVINE, E. E., *Brit. J. Psych. Soc. Work*, 1951, **5**, 6.
MINISTRY OF HEALTH, *Hostels for Difficult Children*, 1944. London.
ROBINSON, J. F., *Amer. J. Psychiat.*, 1947, **103**, 814.
WINNICOTT, D. W., and BRITTON, C., *N.E.F. Monograph No. 1*, 1944, 5.
Idem, *Hum. Rel.*, 1947, **1**, 87.

Reviews

The Geometry of Mental Measurement. By SIR GODFREY H. THOMSON. University of London Press Ltd., 1954. Pp. 60. 6s. 6d.

Factor analysis and the general theory of multiple correlation is apt to be found difficult by the beginner, who must learn to manipulate a somewhat intricate system of algebraic and psychological concepts. This little book attempts to lessen the beginner's difficulties by giving a simply written and more detailed account of some of the difficulties.

It is not suitable as a complete account, but will prove a valuable supplement to the larger treatises. It is freely illustrated with clear and simple diagrams.

W. ROSS ASHBY.

Psychical Research Today. By D. J. WEST, M.B., D.P.M. Gerald Duckworth & Co. Ltd., London, 1954. Pp. 144. 12s. 6d.

The author has excellently fulfilled his intention of giving a survey of the present position, written for those who have some familiarity with psychology and scientific method but who are not specialists in psychical phenomena. He writes with authority; not only does he give a thorough survey of what others have done but he has spent many years in investigation personally. His account shows a well balanced combination of enthusiasm and criticism; throughout, the tone is fair and judicial. It is beautifully written, clear, factual, and well documented, so that the reader who is interested can easily extend his reading. Seldom does a book succeed in giving so much matter at so little cost. It can be strongly recommended.

W. ROSS ASHBY.

The Origins of Psycho-analysis. Letters to Wilhelm Fliess, Drafts and Notes: 1887-1902.

By SIGMUND FREUD. Edited by MARIE BONAPARTE, ANNA FREUD, ERNST KRIS. Authorised translation by ERIC MOSBACHER and JAMES STRACHEY. Imago Publishing Co. Ltd., London, 1954. Pp. 486. Price 30s.

It is reassuring that the editors have not divulged any "secrets" of Freud's personal life. The hesitation, therefore, which one feels about praising the publication of these private letters from Freud to his friend Fliess is overcome by the historical interest and value they have for the reader, who is enabled to appreciate a little of what lay behind the official façade with which Freud faced life.

"They regard me rather as a monomaniac, while I have the distinct feeling that I have touched on one of the great secrets of nature." "I do not count on recognition, at any rate in my life time."

Both his mood and his private practice varied considerably. Sometimes he would have no new patients or new ideas. "I am not working, and it is quiet inside me. If the sexual theory comes up, I shall listen to it." And after a spell of hard work he wrote to his friend, "This psychology is really an incubus—skittles and mushroom-hunting are certainly much healthier pastimes." When he believes he really has found a correct solution to a problem he is elated, "—the whole thing held together, and still does. I can naturally hardly contain myself with delight."

There are references of course to the letters of Fliess whose original mind pleased Freud. "Your letter arrived today, and gave me great pleasure. It breathes health, work and progress. I am naturally most eager to hear everything new . . ." "My best wishes for your wife and child and all your hopes."

The book also contains drafts by Freud of projected work, and there is an admirable introduction by Ernst Kris.

C. E. H. TURNER.

The Lowenfeld Mosaic Test. By MARGARET LOWENFELD. Published by Newman Neame, Ltd., London, 1954. Pp. 360; 144 plates in separate container. Price 50s.

For twenty-five years Dr. Lowenfeld has used the technique of presenting the patient with simple pieces of coloured wood, or plastic, and instructing him to make an arrangement of them. The results, she feels, throw light on the subject's personality and can be used in diagnosis. The book describes what she does and something of the results obtained. There are 360 pages in it, yet it is difficult for me to say much or to report on what is its hard core, for I feel much as if confronted by the grin of a Cheshire cat. The book abounds in contradictions of theory with practice, in promises of explanation which remain unfulfilled, and in exasperating statements like the following:

"It is very difficult in a book concerned with general principles to explain the manner in which the factor of intelligence is shown in a response to the L.M.T., and a considerable experience of the test with many types of people is necessary before a sound assessment of this factor is possible" (p. 195).

"Once again this is a point which becomes obvious with extended knowledge of responses to the test and is impossible to describe" (p. 196).

"Once again this is difficult to describe, or within our limits to illustrate, but it is within the power of the test to demonstrate it" (p. 198).

Regarding the psychologist's difficulties in learning to use the test Dr. Lowenfeld states:

"The first [difficulty] lies in its departure from the modes of assessment in current use. The results are capable neither of statistical assessment nor of verbal evaluation in the current terms. For those, therefore, to whom verbal and statistical assessment are synonymous with the acquisition of accurate knowledge about a complex phenomenon the L.M.T. cannot fail to be an irritation" (p. 27).

The author also points out that

"... the patient analysis of mosaic patterns is tedious, so that the interpreter of L.M.T. responses is always in danger of falling into the trap of subjective intuitive interpretation. If intuition be added to exact analysis, ... it is a valuable tool; but in the absence of exact analysis and a detailed knowledge of existing patterns of response, it is a dangerous instrument that can easily lead into the bog of superficial analogies ... It is in order to avoid subjective evaluation that so little has been said in this book about such relations as that between the forms of pattern which are produced and the possible psychoanalytic interpretation of such elements of design, and for the same reason the scoring methods at one time included in the plan of the book have been withdrawn" (p. 28).

One may wonder how the test can be interpreted, since on the one hand the author explicitly states that neither verbal nor statistical methods of evaluation are practicable while on the other hand she eschews publishing psychoanalytic interpretations, subjective evaluations and other scoring methods.

The fact is that the Lowenfeld Mosaic is not an established Test but a technique which has yet to be validated. As a projective method it may be worth exploring, and Dr. Lowenfeld's originality in developing the project must be warmly acknowledged. Whether or not her theories underlying the technique are valid could quite easily be tested rigorously. Up to the present, it seems that Himmelweit and Eysenck are the only two workers who have attempted serious validation of the technique (*Br. J. Med. Psychol.*, 1944, 20, 203). Though their tests were not extensive they found that an experienced user of the technique could write personality sketches from mosaics with better than chance success when these were matched against psychiatrists' reports. For those interested in studying this projective device, the material consists of 456 pieces in 5 shapes and 6 colours; they are contained in a box, and a standard-sized tray is provided on which to make the design. The tester indicates to the subject being tested the different shapes and colours of the pieces, and then invites him "to do something with these pieces in the box on the tray". Accompanying the book are 144 coloured plates of designs made by American and European subjects.

M. BASSETT.

The Doors of Perception. By ALDOUS HUXLEY. Published by Chatto and Windus, London, 1954. Pp. 63. Price 6s.

This little book forms an account of the author's subjective experiences after taking an experimental dose of mescaline. In it, he describes vividly his heightened perception of colour and texture, and his indifference to time, space, and people. To those who are especially interested in the relation of the hallucinogens to schizophrenia it may perhaps be a little disappointing that more time is devoted to discussing the philosophical implications of the experience than to the actual reporting of sensations; nevertheless, the account is well worth reading. The author must be congratulated on his boldness in submitting himself to the experiment.

M. BASSETT.

Patterns of Error in the Addition Number Facts. By JAMES M. THYNE. University of London Press, 1954. Pp. 275. 10s. 6d.

The book deals exhaustively with the question of accuracy when children learn elementary arithmetic and algebra. The study is basically experimental—finding out just what mistakes they do in fact tend to make—and considers what alterations in the method of teaching and in the lay-out on paper would bring the errors to a minimum.

The author concludes with a number of recommendations, aimed at making the various "drills" of addition, subtraction, etc., flow with the natural processes of thought rather than against them. The book is a substantial contribution to the subject and should be of value to those who teach the subjects, for there is little doubt that clumsy teaching can raise vast difficulties that more skill would avoid.

W. ROSS ASHBY.

On Aphasia. By SIGMUND FREUD. Authorized translation by E. STENGEL, M.D. Imago Publishing Company Ltd. Pp. 105. Price 12s. 6d.

Dr. Stengel's translation makes this work available in English for the first time. It is of deep interest from several points of view. As the translator observes in his valuable introduction, this work forms a link between Freud's studies in Neurology and neuro-anatomy and the start of his theories of psycho-analysis. In particular, we see Freud making use of the principle of functional regression upon which Hughlings Jackson laid such stress, and applying it to mental function. The value of the book to present day clinicians is recognized in current studies of aphasia. As Dr. Ernest Jones remarks elsewhere: "Here Freud shows himself for the first time in his full stature . . ." "It has the close reasoning, the lucidity, the persuasive and thought provoking argumentation, the candid discussion of objections, and the remarkable capacity of ordering his material that became so characteristic of his writings."

DENYS KELSEY.

Medical Psychology. By PAUL SCHILDER. Translated and edited by DAVID RAPAPORT. International Universities Press Inc., New York. Pp. 428. Price \$7.50.

The translator, in his foreword, declares that this book represents "the sweep of the most catholic thinker in the history of psychiatry". Certainly one is amazed that the mind of one man could have comprehended, assessed and correlated such a vast range of material. Schilder gathered together the threads from all the different approaches to psychology: experimental, physiological, analytical, clinical. Moreover, he anticipated with uncanny foresight, some of the directions in which future advances would be made. The contents of the book include: I. The Theory of Perception; II. Action and Language; III. Memory; IV. Instincts, Volition and Action; V. The Ego and Personality.

The book was written in 1923, and naturally enough, advances since then have revealed certain weak spots. The translator has drawn attention to these as they appear. In footnotes he has evaluated them in the light of later work, and has indicated the relevant bibliography. The footnotes form an admirable supplement to the author's work, and this book offers, to both students and advanced workers a breadth of knowledge which is probably not to be found within any other single volume.

Dr. Rapaport has rendered a valuable service in making this work available to English-speaking readers; and he is to be congratulated upon his translation which reads most easily.

There is a serviceable index, and a wide bibliography.

DENYS KELSEY.

New Light on Dreams. By MAX SEROG, M.D. The House of Edinborough Publishers, Boston, U.S.A. Pp. 154. Price \$3.

The author acknowledges the value of Freud's work in elucidating dream phenomena, but takes exception to the rigidity of the laws and concepts which Freud formulated to explain their occurrence. He maintains that an attempt to interpret a dream on the basis of any preconceived system of laws is doomed to failure.

Some of his points the author makes clearly, though they are not new. His own position is based upon the insistence that the dream is to be understood as a manifestation of prelogical primitive thinking. This again is not new. Moreover, this reviewer found some difficulty in appreciating exactly how the author's concept of the dream differs from Freud's, whilst implied self contradictions occur. For example, the author emphasizes in italics that: "Dream interpretation is an understanding art, not an explaining science." But there are surely rules governing the production of a work of art. It is possible that the rather confused impression which the book left upon this reviewer stems in part from the author's difficulty in expressing himself in another than his native tongue. The price of the book, by English standards, seems rather high.

DENYS KELSEY.

The Psychosomatic Concept in Psychoanalysis. Edited by FELIX DEUTCH, M.D. International Universities Press Inc., New York. Price \$4.

This book is the collected papers read at the symposium on the subject, organized in February 1952 by the Boston Psycho-analytic Society and Institute. Taken as a whole, the papers accept that psychosomatic illness represents a psycho-physiological regression, and stresses the complexity of the factors responsible.

The book contains little that is new, but it does point and clarify some of the problems implicit in the psychoanalytic concept, and consider the various lines of research which is required to answer them. The value of the book lies in the breadth of approach to the subject. The price seems rather high.

DENYS KELSEY.

Love, Hate and Reparation. Two lectures by MELANIE KLEIN and JOAN RIVIERE. Psycho-analytical Epitomes No. 2. The Hogarth Press and The Institute of Psycho-analysis. Pp. 119. Price 8s. 6d.

This small book is based upon Public lectures delivered under the auspices of the Institute of Psycho-analysis in 1936. The first part of the book is concerned with some of the mechanisms of the unconscious, and the way in which they underlie feelings of guilt, hate, envy and so forth. The second part of the book traces the growth of emotional life from babyhood. The book is a really admirable exposition of some of the basic concepts of psycho-analysis, in clear non-technical language. It should prove of great value to all who strive to understand themselves, or whose work lies in social service.

DENYS KELSEY.

Sigmund Freud. Life and Work. Volume I. The Young Freud. 1856-1900. By ERNEST JONES. The Hogarth Press. Pp. 444. Price 27s. 6d. net.

In the opening paragraph of the preface the author states: "This is not intended to be a popular biography of Freud: . . . Its aims are simply to record the main facts of Freud's life while they are still accessible, and—a more ambitious one—to try to relate his personality and the experiences of his life to the development of his ideas."

Dr. Jones has realized these aims to an extent of which he alone, from his unique position, was capable. Not only was Dr. Jones one of the "select committee" at the heart of the psycho-analytic movement, but he was an intimate friend of Freud and his family for forty years.

The threefold aspect of the author's task has caused certain chapters to overlap each other to some extent in point of time. If this is at times a little confusing, it is still difficult to imagine how the material could have been presented in any other way.

The story opens with Freud's origins. We see the peculiar mixture of generations living in the same house which provided Freud with his own basic conflicts in such definite form. We learn of his early career as a physiologist, and the discipline of scientific thinking to which he subjected himself, partly in order to check that tendency to speculative rumination which he recognized he had. One is inclined to forget the contributions which Freud made to Biology, to Histology and to Neuro-anatomy and Neuro-pathology: all exact sciences. His contribution to pharmacology, in the Cocaine episode, was less happy!

The personality of the inner man becomes revealed in the account of his betrothal period. This is moving indeed. The author draws a vivid picture of the intensity of feeling of which Freud was capable—love and hate, jealousy, self doubt and, above all, his determination to have the truth, no matter how painful, about any matter which engaged his attention. In this chapter, to quote the author: "One apprehends above all how mighty were the passions which animated Freud . . . He was beyond doubt someone whose instincts were far more powerful than those of the average man, but whose repressions were even more potent. The combination brought about an inner intensity of a degree that is perhaps the essential feature of any great genius."

It was this inner intensity, guided by his determination for the truth which, driving his intellectual powers onto the study of his own mind, enabled Freud to do the work which has rendered his name immortal.

On the scientific side again, we learn of his visit to Charcot, and his contacts with other great figures of the day, Meynert, Flechsig, Strumpell, to name but three. Freud's relationship with Breuer receives much attention. The incidental glimpses we are given of these figures are fascinating in themselves.

The latter third of the book deals with the emergence of psycho-analysis, and Freud's self analysis against Fliess. The final chapter is an exposition of Freud's theory of the mind as it stood in his published writings, illumined by much private correspondence, at the turn of the century.

It is difficult to do justice to a work of this calibre. It is a book which everyone in sympathy with psycho-analysis will wish to read, and one which anyone embarking upon a serious criticism of the doctrine of psycho-analysis would do well to read. Its value will be permanent.

DENYS KELSEY.

Principles of Intensive Psychotherapy. By FRIEDA FROMM-REICHMANN. George Allen and Unwin Ltd., Ruskin House, London. Pp. 224. Price 18s.

This is one of the few books devoted to a study of analytical technique. In the first few chapters the author discusses the personality requirements of someone who proposes to practice deep psychotherapy, explaining how important it is that an analyst should be aware of his own intra-personal difficulties. In subsequent chapters such matters are discussed as the initial interview and the collection of data; problems of interpretation; transference manifestations and their management. The problem of handling relatives is considered at length, and so is the management of crises occurring in the life either of the patient or the therapist.

One gets the impression that the matter of the book was gleaned from long practical experience. It is full of wisdom and stimulative of further thought. The book should be of great value to the student and to the worker in any of the services ancillary to psychiatry, whilst even the experienced therapist could read it with profit.

DENYS KELSEY.

New Concepts of Hypnosis as an Adjunct to Psychotherapy and Medicine. By BERNARD C. GINDES, with a foreword by ROBERT LINDNER. George Allen and Unwin Ltd., London. Pp. 262. Price 15s.

Through his own practice the author has become sincerely convinced of the value of Hypnosis, and has obviously thought deeply around and about the whole subject.

The book begins with a historical survey of hypnosis. The author then discusses the relationship of hypnosis to suggestion, and considers the psychological and physiological phenomena of the hypnotic state. The author has analysed the mechanism of the induction of hypnosis, and enunciates what he calls the Hypnotic Formula: "Misdirected attention + belief + expectation must lead to the hypnotic state." This is at least a working hypothesis. Various methods of induction are described, with references to the various personalities encountered amongst prospective subjects.

The value and limitations of therapy by simple hypnotic suggestion are considered, and the author goes on to say a little about hypno-analysis. One could wish he had dwelt longer on this aspect of his subject.

The subject matter is presented in a very concise and unpretentious manner, and this book should be of value to the psychiatrist, the general practitioner and the student.

DENYS KELSEY.

Bibliography and Epitome*

VOL. 29	ACTA PSYCHIAT. NEUR.	1954
Body-build of the Male Duodenal Ulcer Individual. <i>Wretmark, G.</i>		229
Thrombosis Cerebri in Young Persons. <i>Pakkenberg, H.</i>		237
Psychosis in Relation to Treatment with Corticotrophin and Cortisone. <i>Trethowan, W. H.</i>		243
Arhinencephalia and Imbecility. <i>Steenfeldt-Foss, O. W.</i>		261
The Tractus Trigeminalis of Wallenberg. <i>Verhaart, W. J. C.</i>		269
*The Childhood of Schizophrenics. <i>Nielson, C. K.</i>		281
Visual Disturbances Associated with Gliomas of the Temporal and Occipital Lobe. <i>Edmund, J.</i>		291
Some Clinical Features of the Symptomatology of Gliomas of the Temporal Lobe. <i>Edmund, J.</i>		311
Acute Septic Meningitis during an Influenza-like Epidemic in Greenland. <i>Dein, E.</i>		319
The Incidence of Mental Diseases in Norway During World War II. <i>Ødegaard, Ø.</i>		333
Hyperstrogenic Cyclic Psychosis. <i>Lingjaerde, P., and Bredland, R.</i>		355
Effect of Evipan on the Reaction Times for Light and Sound in Mental Disorders. <i>Grunewald, K.</i>		365
Reaction Time for Light and Sound in Neurotics with Special Reference to Impaired Wakefulness. <i>Grunewald, K.</i>		369
Psychogenic Deafness. <i>Arentsen, K.</i>		391
Presenile Dementia. <i>Eitinger, L.</i>		411
Excretion of Neutral 17-Ketosteroids in Normal and Neurasthenic Subjects with Special Reference to its Diurnal Variations. <i>Birket-Smith, E.</i>		423
Fatal Subarachnoid Haemorrhages in Pregnant Women with Intracranial and Intramedullary Vascular Malformations. <i>Christensen, E., and Larsen, H.</i>		441

The Childhood of Schizophrenics

At Gaustad Mental Hospital, Oslo, the childhood background has been examined for 55 schizophrenic women admitted to the hospital from May, 1948 to July, 1951.

As checking method the so-called matching system has been used. For each patient, the childhood background has been examined of two healthy women of the same age, marital state, occupation and whether grown up in town or in the country. It was found that in the childhood background of the schizophrenic women there was no difference worth mentioning from that of the healthy controls.

(Author's Abstr.)

ACTA PSYCHIAT. NEUR., SUPPT. 1954

Congenital Syphilis. <i>Hallgren, B., and Hollström, E.</i>	No. 93
Acute Head Injuries in Boxers. <i>Larsson, L. E., et al.</i>	No. 95
An Analysis of the Mechanism and a Study of the Morbid Anatomy of Neurological Disorders Incident to Operations on the Neck and Thorax. <i>Cammermeyer, J., and Adams, R. D.</i>	No. 96

VOL. 59 AM. J. MENT. DEFIC. OCTOBER, 1954

Measures of Ability in a Pre-academic Group of Brain-injured Children. <i>Paak, E. B.</i> ..	220
Training the Mentally Deficient for Community Adjustment. <i>Shachoy, G. R.</i> ..	226
The Experimental Administration of <i>Celastrus paniculata</i> in Mental Deficiency Practice. <i>Morris, J. V., et al.</i>	235
Pulmonary Tuberculosis Mortality in a Mental Deficiency Hospital. <i>Richards, B. W.</i> ..	245
The Hearing of Mental Defectives. <i>Foale, M.</i>	254
Commitment Procedures for the Mentally Deficient. <i>Crowell, D. H., and Herrick, C. J.</i> ..	259
The Validity of Projective Interpretation of Art Products of Mental Defectives. <i>Popplestone, J. A.</i>	263
A Sociometric Study of Institutionalized Mental Defectives. <i>Sutherland, J. S., et al.</i> ..	266
Mental Deficiency. <i>Oster, J.</i>	425
Dental Care and Home-Training of the Mentally Retarded Child. <i>Adelson, J. J.</i> ..	434
The Present Status of Defective Delinquency in Massachusetts. <i>Farrell, M. J., and Ogonik, J.</i>	439
The Differential Diagnosis of Mental Deficiency in Adolescents. <i>Toolan, J. M.</i> ..	445
Intellectual Development of the Cerebral Palsied Child as a Factor in Therapeutic Progress. <i>Lamm, S. S., and Fisch, M. L.</i>	452

* A number of abstracts in this section are reproduced from *Chemical Abstracts*. To the Editors of this Journal we extend our grateful thanks.

- The Place of Mental Deficiency in a Medical Curriculum. *Gibson, R.* 458
 The Utility of Short Forms of the Stanford-Binet Tests of Intelligence with Mentally Retarded Children. *Birch, J. W.* 462
 Rotation Errors Made by Brain-injured and Familial Children on Two Visual-Motor Tests. *Halpin, V. G.* 485

VOL. 24

AM. J. ORTHOPSYCHIAT.

1954

- Emotional Factors in Family Breakdown. *Lippman, H. S.* 445
 A Philosophy of Community Action. *Buell, B.* 454
 Economic, Cultural and Social Factors in Family Breakdown. *Burgess, E. W.* 462
 Some Theoretical Considerations on the Problem of Mother-Child Separation. *Mead, M.* 471
 Childhood Schizophrenia. *Herskowitz, H. H., et al.* 484
 Benefits of "Combined Therapy" for the Hostile Withdrawn and the Hostile Dependent Personality. *Fried, E.* 529
 Consistency of Affect and Symbolic Expression. *Bolgar, H.* 538
 An Experiment in Interdisciplinary Education in Child Care. *Ross, H., and Schour, E.* . . 546
 A Community Program of Mental Health Education Using Group Discussion Methods. *Brashear, E. L., et al.* 554
 Observations on the Development of Transvestitism in Boys. *Friend, M. R., et al.* . . 563
 Residential Treatment of Chronic Asthmatic Children. *Hallowitz, D.* 576
 Emotional Factors in Children with Rheumatoid Arthritis. *Blom, G. E., and Nicholls, G.* . 588
 A Study of the Personality Patterns of Children and Adolescents with the Peptic Ulcer Syndrome. *Taboroff, L. H., and Brown, W. H.* 602
 Antisocial Acting Out Symposium. *Lippmann, H. S., et al.* 667
 A Comprehensive Theory of Psychotherapy. *Symonds, P. M.* 697
 The Extension of Psychodiagnosis to Parents in the Child Guidance Setting. *Rosenzweig, S., and Cass, L. S.* 715
 Parent Education or the Illusion of Omnipotence. *Bruch, H.* 723
 Prolonged Adolescence. *Blos, P.* 733
 Follow-up Studies of Shy, Withdrawn Children. *Morris, D. P., et al.* 743
 Children with Circumscribed Interest Patterns. *Robinson, J. F., and Vitale, L. J.* . . 755
 Contemporary Concepts of Learning. *Liss, E., et al.* 767
 Some Principles of Psychotherapy with Atypical Children. *Knowlton, P.* 789
 The Dynamic Significance of the Mother-Child Relationship in the Case of a Young Delinquent with Psychotic Mechanisms. *Rose, K. E., and Shriver, M.* 797

VOL. 33

AM. J. PHYS. MED.

OCTOBER, 1954

- Music as an Adjunct in the Treatment of Brain-damaged Patients. *Fields, B.* 273

DECEMBER

- The Use of Pathological and Unlocking Reflexes in the Rehabilitation of Spastics. *Fay, T.* 347
 Obstetrical Factors in the Etiology of Cerebral Palsy. *Latham, D., et al.* 353
 The Organization of a Cerebral Palsy Mental Retardation Clinic. *Cohen, H. G.* 359

VOL. 111

AM. J. PSYCHIAT.

SEPTEMBER, 1954

- State and Veterans Administration Cooperation towards Better Mental Health. *Tompkins, H. J.* 172
 Two Hundred and Thirty-three Patients with Mental Illness Treated with E.C.T. in the Presence of Tuberculosis. *Pleasure, H.* 177
 *The Effect of Ion Exchange Resins in the Paroxysmal Disorders of the Nervous System. *Klingman, W. O.* 182
 Prefrontal Leucotomy. *Constantinides, C. D., and Stroussopoulos, B.* 196
 *Changes in Symbolic Expression with Sodium Amytal. *Weinstein, E. A., and Malitz, S.* . . 198

The Effect of Ion Exchange Resins in the Paroxysmal Disorders of the Nervous System

Paroxysmal disorders of the nervous system such as epilepsy, migraine, and Ménière's disease can develop a disturbance of electrolyte and water balance of cerebral and labyrinthine tissues when the paroxysms of the attack become frequent and severe. Experimental work and tissue analysis support this assumption. The introduction of ion exchange resins into the field of therapy has offered an opportunity to influence electrolyte (particularly Na and K) and water balance in these conditions. Clinical experience and results from the use of these resins have established their usefulness in the therapy of epilepsy, migraine, and Ménière's disease.

(Author's Abstr.)

Changes in Symbolic Expression with Sodium Amytal

1. Attitudes toward and recognition of illness and hospitalization were studied before and during the intravenous administration of amobarbital sodium. Changes in language patterns and nonverbal aspects of behavior were compared in 50 patients with pre-existing brain disease and a like number of normal subjects with comparable disabilities.

2. Prior to receiving the drug, all patients expressed awareness of illness, were completely oriented for place, and identified the examiners correctly. With the drug, explicit denial of illness, disorientation for place, and gross misidentification of the examiners occurred only in some of the patients with brain damage. In the normal group, subjects talked of illness in terms of a third person, used more "concrete" symbols, selectively misinterpreted questions about illness and misnamed the examiners in "paraphasic" fashion.

3. Amobarbital sodium did not necessarily make patients more communicative. Thirty patients in both groups showed no changes in verbal or nonverbal behavior. Some talked more, others less.

4. Euphoria was noted in 11 patients in the normal group and in 17 with brain disease. The euphoria frequently alternated with paranoid and depressed attitudes. It was not related to the dosage of the drug and in some instances came on after the interview was terminated. Ludicrous aspects of behavior were prominent.

5. The euphoria, drowsiness, dysarthria, and dystaxia produced, unlike the nystagmus, cannot be explained in terms of any particular neurophysiologic mechanism of action of barbiturates but must be considered in symbolic as well as physiological concepts.

6. Amobarbital sodium, given under the conditions described, appeared to provide a milieu of brain function in which not new motivations but new symbolic forms for their expression could be evolved and maintained. These are best interpreted not in terms of "release of repressed material" but as an adaptive, more effective defense in a situation of greater stress.

7. The productions of patients under the influence of amobarbital sodium should be interpreted not only in a factual referential context but as a symbolic representation of wishes and feelings expressed in personal, spatial, and temporal terms.

8. The observed behavior could not be explained in physiological or psychophysiological terms as "cortical depression" or "release of inhibition". It is suggested that much of the behavior ascribed to such mechanisms may be largely manifestations of a particular observer-subject relationship.

(Authors' Abstr.)

OCTOBER

Social Behavior after Treatment. <i>Banay, R. S.</i>	241
The Use of Group Psychotherapy in Posthospitalization Treatment. <i>Blan, D., and Zilbach, J. J.</i>	244
The Use of a Control Population in Neuropsychiatric Research. <i>Brockway, A. L., et al.</i>	248
The Incidence of EEG Abnormality Among Patients with Mental Disorders of Apparently Nonorganic Origin. <i>Ellingson, R. J.</i>	263
An Experimental Approach to Psychological Stress. <i>Cohn, J. B., and Rubinstein, J.</i>	276
Narcoanalysis and Criminal Law. <i>Macdonald, J. M.</i>	283

NOVEMBER

A Study of Psychotherapeutic Relationships Between Physicians and Schizophrenic Patients. <i>Whitehorn, J. C., and Betz, B. J.</i>	321
Arteriosclerotic Muscular Rigidity with Special Reference to Gait Disturbances. <i>Bruetsch, W. L., and Williams, C. L.</i>	332
Psychodynamic and Clinical Observations in a Group of Unmarried Mothers. <i>Cattell, J. P.</i>	337
Comfort, Effectiveness, and Self-Awareness as Criteria of Improvement in Psychotherapy. <i>Parloff, M. B., et al.</i>	343
*Some Prognostic Factors in 538 Transorbital Lobotomy Cases. <i>Jackson, C. L., and Jaco, E. G.</i>	353
Initial Psychiatric Findings of Recently Repatriated Prisoners of War. <i>Segal, H. A.</i>	358
A Study of Juvenile Sex Offenders. <i>Atcheson, J. D., and Williams, D. C.</i>	366
Moral Treatment and the Mental Hospital. <i>Ozarin, L. D.</i>	371

Some Prognostic Factors in 538 Transorbital Lobotomy Cases

A statistical analysis was made of the significance of 18 psychiatric and sociologic factors in improvement and unimprovement of 538 mental patients following transorbital lobotomy. The results indicated that 57 per cent. showed improvement while 43 per cent. failed to improve. Fatalities amounted to 2 per cent. Fifty-three per cent. left the hospital following transorbital lobotomy with 31 per cent. still remaining out of the hospital to date.

Thirteen factors were found to significantly discriminate between improvement and unimprovement following transorbital lobotomy: sex, color, diagnosis, duration of illness, duration of hospitalization, number of electric shock treatments, number of insulin coma hours, marital status, education, occupational class, church affiliation, venereal history, and readmission status.

The remaining 5 factors found to be insignificant in improvement and unimprovement following transorbital lobotomy were: age, onset of illness, suicidal tendencies, birth order, and number of siblings of the patient.

Profiles of the theoretical patient more likely and less likely to improve following transorbital lobotomy are presented.

(Authors' Abstr.)

VOL. 8

AM. J. PSYCHOTHER.

JULY, 1954

Some Aspects of the Psychopathology of Schizophrenia. <i>Arieti, S.</i>	396
Psychoanalysis Theory and Science. <i>Flowerman, S. H.</i>	415
Limitations of Psycho-somatic Treatment. <i>Lowy, S.</i>	442
Present Status of Psychosomatic Medicine. <i>Macalpine, I.</i>	454
Fact and Value in Psychotherapy. <i>Wolff, W.</i>	466
The Psychiatry of the Adult Only Child. <i>Clark, R. A., and Capparell, H. V.</i>	487

OCTOBER

The Reality Principle. <i>Buhler, C.</i>	626
The Psychology of Treason and Loyalty. <i>Meerloo, J. A. M.</i>	648
The Analysis of Transference as an Interpersonal Process. <i>Wolstein, B.</i>	667
Combined Group and Individual Therapy in Private Practice. <i>Papanek, H.</i>	679
Effects of Music on Personality by Way of Figure Drawings. <i>Alexander, H.</i>	687

VOL. 72

ARCH. NEUR. PSYCHIAT.

AUGUST, 1954

Metastasis of Neoplasms to the Central Nervous System and Meninges. <i>Lesse, S., and Netsky, M. G.</i>	133
Serum Lipid Studies in Multiple Sclerosis. <i>Roboz, E., et al.</i>	154
Biological Significance of Head Posture in Unilateral Disequilibrium. <i>Halpern, L.</i>	160
Rapid Determination of Optimum Medication in Recalcitrant Cases of Epilepsy. <i>Putnam, T. J., et al.</i>	169
*Effects of Castration on Hypersexual Behavior induced by Rhinencephalic Injury in Cat. <i>Schreiner, L., and Kling, A.</i>	180
Occlusion of the Carotid Arteries. <i>Fisher, M.</i>	187
Reciprocal Inhibition as the Main Basis of Psychotherapeutic Effects. <i>Wolpe, J.</i>	205
Pulmonary Abscesses in a Mental Hospital. <i>Levy, A., and Baker, J. R.</i>	227
Patterns of Perceptual Organization with Simultaneous Stimuli. <i>Bender, M. B., et al.</i>	233

Effects of Castration on Hypersexual Behavior induced by Rhinencephalic Injury in Cat

Lesions of the rhinencephalon, largely limited to the amygdaloid nuclei, precipitate a state of chronic hypersexuality in the adult male cat. Such behavior is abolished by castration. It is maintained, therefore, by endocrine secretions of the intact testes, since after gonadectomy the daily administration of 50 mg. of testosterone propionate restored the hypersexual behavior to precastration levels.

Some neuroendocrine relationships bearing upon these findings are discussed. Ablation of rhinencephalic structures appears to release from suppression certain subcortical structures which, together with neocortical influences, contribute to the initiation and maintenance of hypersexual behavior displayed by the gonadally intact, adult male cat.

(Authors' Abstr.)

SEPTEMBER

Experimental Observations on "Psychosomatic" Mechanisms. <i>French, J. D., et al.</i>	267
Centering of Eyes. <i>Bender, M. B., et al.</i>	282
Polarographic Study of Cerebral Collateral Circulation. <i>Meyer, J. S.</i>	296
*Psychiatric and Neurological Side-effects of Isoniazid and Iproniazid. <i>Pleasure, H.</i>	313
Schizophrenic-like Psychotic Reactions with Administration of Isoniazid. <i>Wiedorn, W. S., and Ervin, F.</i>	321
*Familial Occurrence of Migraine Headache. <i>Goodell, H., et al.</i>	325
Great Occipital-Trigeminal Syndrome as Revealed by Induction of Block. <i>Skillem, P. G.</i>	335
Proteolytic Enzyme System in Sexual Deviates. <i>Marsh, J. T., et al.</i>	341
Effect of Atropine on Leucocyte Counts of Patients with Mental and Emotional Disease. <i>Hoffer, A.</i>	348
Influence of ECT and Insulin Coma on Level of Adrenocortical Steroids in Peripheral Circulation. <i>Bliss, E. L., et al.</i>	352
Ribosuria in Muscular Dystrophy. <i>Walton, J. N., and Latner, A. L.</i>	362
Statistical Control Studies in Neurology. <i>Madonick, M. J., and Savitsky, N.</i>	365

Psychiatric and Neurological Side-effects of Isoniazid and Iproniazid

In a group of 602 tuberculous mentally ill patients treated with isoniazid with a dose of 4 mg. per kilogram per day, the toxicity in comparison with the effectiveness of the drug was considered not to be serious. Only five patients who required isoniazid because of their tuberculosis had to have interruption of the drug because of toxicity, three because of seizures, and two because of peripheral neuropathy. One patient who was moribund with advanced tuberculous meningitis and who was given a larger than normal dose, apparently died of convulsions induced by isoniazid.

Isoniazid has an aggravating effect on convulsive tendencies even in therapeutic dosage, especially in brain-damaged patients. That this effect is not so great as to contraindicate treatment of such patients was shown by administration to 25 patients who had had lobo-

tomies. Antiepileptic drugs, especially phenobarbital, can usually, but not always, be depended on as antidotes. They were very effective in 18 of 19 patients with epilepsy who were given isoniazid.

Isoniazid even in normal dosage sometimes causes agitation, which usually can be readily managed by sedatives without discontinuation of the isoniazid. However, in excessive dosage it is capable of causing psychoses, as the toxicity is proportional to the plasma level; 16 patients with psychosis caused by isoniazid have been received at the Edgewood Division of Pilgrim State Hospital. In addition, iproniazid, which is far more toxic and which is used by few physicians, has caused the transfer to this hospital of nine psychotic patients. Twenty-five is a very small number when compared with the many thousands of patients who have been treated in New York City with these drugs from March, 1952 to March, 1954.

In excessive dosage isoniazid frequently causes peripheral neuropathy, but when normal therapeutic doses are used this effect is mild and does not contraindicate treatment in the presence of alcoholic neuropathy.

It does not appear to be dangerous to the aged, to arteriosclerotic patients, or to alcoholics. There is considerable individual variation in reactions to the drug, and some symptoms may appear early and disappear while the drug is continued, while others may appear only after prolonged administration. Hence large single doses do not give a reliable test of the long-term toxicity.

(Author's Abstr.)

Familial Occurrence of Migraine Headache

Highly significant evidence has been offered demonstrating the hereditary character of migraine and permitting one further to assume correctly that the inheritance of the migraine headache trait is through a recessive gene with a penetrance of approximately 70 per cent.

(Authors' Abstr.)

OCTOBER

*Prefrontal Ultrasonic Irradiation. <i>Lindstrom, P. A.</i>	399
Ulceration and Malacia of the Upper Alimentary Tract in Neurologic Disorders. <i>Watson, J. McD., and Netsky, N. D.</i>	426
Brain Changes in Patients with Extensive Body Burns. <i>Madon, L., and Alpers, B. J.</i>	440
Relationship Between Rorschach Determinants and Psychosis in Barbiturate Withdrawal Syndrome. <i>Kornetsky, C.</i>	452
Alterations in the "Field" in a Brief Depressive Episode. <i>Shands, H. C.</i>	455
Cortical Representation and Functional Significance of the Cortico-motoneuronal System. <i>Bernhard, C. G., and Bohm, E.</i>	473

Prefrontal Ultrasonic Irradiation—A Substitute for Lobotomy

Transcranial and direct irradiation of the animal brain with high frequency sound was studied. A technique was developed for the production of graded subcortical lesions.

Therapeutic ultrasonic damage to the prefrontal lobes was applied to human beings as a substitute for lobotomy. Eight case histories representative of a series of 20 patients are reported. The procedure is comparatively simple, carries a minimal risk, and has, among this limited number of patients, given clinical results that compare favorably with those of surgical lobotomies in similar cases.

Fifteen of the patients treated for intractable pain due to malignant tumors later succumbed to their diseases, and 14 complete necropsies were performed. The histological damage in the path of the sound beam was localized mainly to the white matter. A satisfactory lobotomy effect was obtained in most cases in spite of the fact that the tissue alterations were minimal. The ultrasonic damage can be controlled and graded, from a reversible or minimal effect to a gross necrosis in the subcortex, without opening the dura. Unintentional mutilation can be avoided.

(Author's Abstr.)

NOVEMBER

Mania in Childhood. <i>McHarg, J. F.</i>	531
Clinical Assessment of Passive-aggressive Personality. <i>Whitman, R. M., et al.</i>	540
Succinylcholine Chloride in ECT. <i>Wilson, W. P., et al.</i>	550
Psychological Studies of Seven Epileptic Hemiparetics Before and After Hemispherectomy. <i>Uecker, A. E., et al.</i>	555
*Prognosis in Transorbital Lobotomies Relative to Body Type. <i>Kline, N. S., et al.</i>	565
Brain Tumor and Lumbar Puncture. <i>Lubic, L. G., and Marotta, J. T.</i>	568
Pathogenesis of Hepatocerebral Disease. <i>Okinaka, S., et al.</i>	573
Inactivation of Antibodies. <i>Williams, H. W., et al.</i>	579
*Studies of 17-Hydroxycorticosteroids. <i>Bray, P. F., et al.</i>	583
Control of Two Simultaneous Voluntary Motor Acts in Normals and in Parkinsonism. <i>Schwab, R. S., et al.</i>	591
Effect of Cortisone Acetate Administered Intracisternally in Cats. <i>Feldman, S., and Samueloff, M.</i>	599
*Localization of Discharge in Temporal Lobe Automatism. <i>Feindel, W., and Penfield, W.</i>	605
*Classification of the Epilepsies with Particular Reference to Psychomotor Seizures. <i>Symonds, C.</i>	631

Prognosis in Transorbital Lobotomies Relative to Body Type

In a series of 84 somatotyped patients with transorbital lobotomies, (a) mesomorphic males and (b) females with above average endomorphy gave the best response.

The percentage of females discharged was smaller than that of males.

Patients with above-average total endowment did better than those with total endowment below the average.

A more extensive study relating somatotype to response to psychosurgery would be of value in selecting candidates for this procedure.

(Authors' Abstr.)

Studies of 17-Hydroxycorticosteroids

Adrenocortical function was studied in subjects with convulsive disorder. Response tests used were the eosinophile response to corticotropin, the glucose response to corticotropin, and the plasma 17-hydroxycorticosteroid response to corticotropin.

Although the eosinophile response to corticotropin was adequate in all groups, the steroid response to corticotropin in those patients receiving diphenylhydantoin was reduced very significantly as compared with the control group.

This observation in the diphenylhydantoin-treated group is discussed. The suggestion is made that diphenylhydantoin therapy produces a relative adrenocortical unresponsiveness which may be a factor in the action of diphenylhydantoin on brain excitability.

(Authors' Abstr.)

Localization of Discharge in Temporal Lobe Automatism

In a series of 155 patients operated upon for the treatment of temporal lobe seizures, 121 (78 per cent.) had attacks characterized by behavior automatism. This would include unresponsiveness, confusion, masticatory movements, and inappropriate but often elaborate behavior, for which the patient is later amnesic.

From a detailed analysis of the seizure patterns of 50 patients with temporal lobe automatism, it is concluded that automatism may be preceded by no warning, or by one or more warning features. There is, therefore, true ictal, as well as postictal, automatism.

Among the variety of phenomena which may precede the automatism in the seizure pattern, the commonest are abdominal sensation, conscious confusion, tonic or adversive motor features, somatic sensation, cephalic sensation, and feelings of unreality.

Conscious confusion followed by tonic or adversive motor features constitutes a common epileptic "march" leading into automatism.

Stimulation of the brain in the conscious patient undergoing surgical treatment for temporal lobe seizures has produced automatism and amnesia, sometimes with widespread suppression of the electrical activity of the cortex. Twelve cases are presented to illustrate these stimulation responses.

The area responsible for the initiation of behavior automatism appears to center in the periamygdaloid region. This includes the uncus, the amygdaloid nucleus, the ventral claustrum, and the temporoinsular cortex deep in the anterior part of the Sylvian fissure. The anatomy of this complex region is reviewed.

It is pointed out that the periamygdaloid region is particularly susceptible to involvement by tentorial herniation, either by direct mechanical distortion of the tentorial edge or by interference with its blood supply by compression of the anterior choroidal artery. The present studies, therefore, are consistent with previous views that incisional sclerosis produced by tentorial herniation at birth is a cause of temporal lobe seizures coming on later in life.

Evidence is presented that the deep mesial structures of the temporal lobe are concerned in motor responses which may be additional to those derived from the Rolandic, supplementary motor, and second sensorimotor areas.

The term uncinate fits is inappropriate to describe attacks with olfactory and gustatory aura, since only about 5 per cent of patients with behavior automatism have such features. It is noted that temporal lobe seizures with behavior automatism more closely correspond, as regards both the seizure pattern and the site of the pathological lesion, to the uncinate fits as described by Hughlings Jackson.

The present observations, together with subsequent animal experiments, would support the view that the claustramygdaloid gray matter can be considered along with the diffuse projection systems of the thalamus and brain stem as a region capable of exerting diffuse regulatory effects on other parts of the brain. Evidence, in particular from the studies in man, indicates that the periamygdaloid region is also concerned in the processes of memory recording and the maintenance of the normal conscious state, both of which are clearly essential factors in the mechanism of behavior.

(Authors' Abstr.)

Classification of the Epilepsies with Particular Reference to Psychomotor Seizures

To sum up, temporal lobe epilepsy comprises a group of epilepsies having in common a site of discharge in the region of the temporal lobe. The clinical pattern of these seizures varies with the precise situation and direction of spread of the discharge. The seizures may be of major, minor, or minimal degree. We may hope that with better correlation of clinical pattern with demonstrable lesion or EEG focus more accurate localization will be achieved. The clinical features of anterior, deep or superficial, discharging lesions may prove to

be distinct. The pathological classification of the temporal lobe epilepsies is a separate problem. Why are focal seizures in this situation so common without any clinical evidence of coarse or progressive lesion? The concept of incisural sclerosis from birth injury (Earle and associates) may provide an answer, but there is much scope still for the neuropathologist in the elucidation of this problem.

(Author's Abstr.)

DECEMBER

Language Patterns in Psychotic and Psychoneurotic Subjects. <i>Lorenz, M., and Cobb, S.</i>	665
Chronic Mercurialism. <i>Brown, I. A.</i>	674
Ménière's Disease. <i>Rosen, S.</i>	682
*Carbohydrate Metabolism in Brain Disease	
I. Glucose Metabolism in Multiple Sclerosis. <i>Henneman, D. H., et al.</i>	688
III. Fructose Metabolism in Schizophrenic, Manic Depressive and Involuntional Psychoses. <i>Henneman, D. H., et al.</i>	696
Serial EEG and Clinical Studies in a Case of Prolonged Insulin Coma. <i>Shagass, C., and Rowsell, P. W.</i>	705
Analysis of Some Factors in Spontaneous Subarachnoid Hemorrhage. <i>Jacobson, S. A.</i>	712
Use of N-methyl- α , α -methylphenylsuccinimide in Treatment of Petit Mal Epilepsy. <i>Zimmerman, F. T., and Burgemeister, B. B.</i>	720
Familial Periodic Paralysis, Myotonia, etc. <i>Stevens, J. R.</i>	726
Studies on the Central Excitatory State. <i>Berlin, L., et al.</i>	764

Carbohydrate Metabolism in Brain Disease. I

Carbohydrate metabolism in patients with multiple sclerosis is abnormal. Fasting whole blood lactic and alpha-keto glutaric acid concentrations are elevated. After the oral administration of 100 gm. of glucose there is a lag in the return to fasting level of the true blood glucose, an increased accumulation of lactic and perhaps pyruvic acids, and a rise, rather than the normal fall, in plasma citric acid and whole blood alpha-keto glutaric acid concentrations.

(Authors' Abstr.)

Carbohydrate Metabolism in Brain Disease. III

Pure fructose was administered to normal subjects and psychotic patients. Fructose tolerance was normal in patients with schizophrenic, manic-depressive, and involuntional psychoses. The intermediate metabolism of the fructose was only slightly abnormal in the psychotic group. The most important difference from the normal was the occurrence of a rise, rather than the normal fall, in true blood glucose concentration after fructose given orally; this rise, together with the entrance of some fructose into the common metabolic pool, perhaps explains the moderately increased accumulation of citric acid in the blood of the psychotic patients who received fructose. This increased accumulation of citric acid was also observed after the intravenous infusion of fructose.

The finding of normal fructose tolerances in patients with the psychoses discussed here rules out any commonly recognized hepatic disease as the cause of the disordered intermediary carbohydrate metabolism described previously.

(Authors' Abstr.)

VOL. 77	BRAIN	SEPTEMBER, 1954
Lesions of the Cerebral Hemispheres and Their Effects upon Optokinetic and Caloric Nystagmus. <i>Carmichael, E. A., et al.</i>		345
Balint's Syndrome. <i>Hecaen, H., and de Ajuriaguerra, J.</i>		373
Physiological Processes Related to Consciousness and Perception. <i>Gellhorn, E.</i>		401
The Function of the Cerebral Cortex. <i>Goody, W., and Reinhold, M.</i>		416
The Physiological Mechanism of Referred Shoulder-tip Pain. <i>Doran, F. S. A., and Ratcliffe, A. H.</i>		427
Cerebral Control of Respiration. <i>Turner, E. A.</i>		448
*New Problems of Aphasia. <i>Conrad, K.</i>		491
Agraphia Due to a Left Parietal Glioma in a Left-handed Man. <i>Zangwill, O. L.</i>		510
Language Laterality in Left-handed Aphasics. <i>Goodglass, H., and Quadfasel, F. A.</i>		521
Recovery from "Muscular Dystrophy". <i>Nattrass, F. J.</i>		549
*An Unusual Type of Pre-senile Dementia. <i>Corsellis, J. A. N., and Brierley, J. B.</i>		571
The Value of Axon Responses in Determining the Site of Lesion in Traction Injuries of the Brachial Plexus. <i>Bonney, G.</i>		588
Recurrent Convulsive Seizures as a Sequel to Cerebral Infarction. <i>Dodge, P. R., et al.</i>		610

New Problems of Aphasia

The author has sought to prove that aphasia regarded as a disturbance of the actual genesis of the process of verbalization is consonant with the basic ideas of Jackson on evolution and dissolution of function. The physiological ideas of Jackson can be transferred to the psychological field. They have then to deal with the evolution and dissolution of gestalts. Aphasia is an example for the dissolution of the process of gestalt in the course of verbalization.

Tumors of the Hypoglossal Nerve. <i>Raney, R. B., et al.</i>	160
The Electromyogram in the Triad of Muscular Atrophies. <i>Marinacci, A. A.</i>	166
Parkinsonism and Trauma. <i>Nielsen, J. M.</i>	193
Effects of Extraneous Poisons on the Nervous System. III. The Asphyxiant Gases. <i>Courville, C. B., and Myers, R. O.</i>	197
The Facio-scapulo-humeral Type of Primary Myopathy. <i>Nielsen, J. M., and Anderson, E. A.</i>	224
Metastatic Fibrosarcoma of the Skull. <i>Coggin, J., and Courville, C. B.</i>	228
Death from Epilepsy. <i>Thompson, G. N.</i>	236

VOL. 15	DIS. NERV. SYST.	AUGUST, 1954
Metinon in Myasthenia Gravis. <i>Tether, J. E.</i>		227
The EEG in Blood Diseases. <i>Tarnower, S. M., et al.</i>		232
A Rare Intracranial Lesion. <i>Mitchell, H. C.</i>		235
ECT and Depressions. <i>Campbell, J. D.</i>		241
A Study of the Relationship Between Music and Post ECT Awakening. <i>Shatin, L., et al.</i>		250

SEPTEMBER

*Experimental Psychiatry. III. A Chemical Concept of Psychosis. <i>Rinkel, M., et al.</i>	259
The Arnold-Chiari Malformation. <i>Schuster, D.</i>	264
"Non-shock" Therapies in Clinical Practice. <i>Pacella, B. L.</i>	267
The Problem of Conjugal Paranoia. <i>Revitch, E.</i>	271
A Psychiatric Floor in a General Hospital. <i>Johnson, R. W.</i>	278
*Results of Lobotomy in Chronic Psychosis. <i>Diamond, L. S., and Stauffacher, J. C.</i> ..	282

Experimental Psychiatry. III. A Chemical Concept of Psychosis

Experimental evidence has been presented that seems to indicate that a natural error in the adrenalin cycle may be an important, although probably not the only, factor in the origination of psychosis. This brings into focus a new chemical concept of psychosis, and calls for more intensive research in experimental psychiatry in the production of artificial psychosis.

(Authors' Abstr.)

Results of Lobotomy in Chronic Psychosis

It would appear that there is little change in the psychotic ideation of these patients but adverse behavior manifestations have been altered considerably, as manifested by the high percentage of improvement shown in assaultiveness, agitation, and impulsiveness. In other words, the authors were finding that lobotomy does not eliminate the psychosis in many of their patients but enables them to live more comfortably with it and, as a result, they are easier to manage. The improvement in the 77 chronic patients, who were not helped by any other form of treatment, may be best indicated by the fact that ten are out of the hospital, either going to school or working, and three more could be considered for discharge if conditions at home were more favorable for their adjustment. The results of lobotomy on carefully selected patients, whose illness has been very chronic and who have not responded to other types of treatment, are sufficiently favorable to warrant further use of this therapeutic procedure.

(Authors' Abstr.)

OCTOBER

Emotional Aspects of the Narcolepsies. <i>Bonstedt, T.</i>	291
Contributions of Carbonic Anhydrase to Sensitivity of CNS and to CO ₂ Therapy. <i>Ashby, W.</i>	297
On the Natural History of Hysteria in Women. <i>Ziegler, D. K., and Paul, N.</i>	301
Treatment of Cerebral Fat Embolism. <i>Brown, De W. W.</i>	307
Involuntal Schizophrenia. <i>Polonio, P.</i>	310
Noradrenalin in Anaphylactic Shock from Insulin. <i>Benham, W. D.</i>	317

NOVEMBER

*Orbital Undercutting in the Treatment of Psychoneuroses, Depressions and Senile Emotional States. <i>Scoville, W. B.</i>	324
The Funkenstein Test as a Guide to Treatment in the Neuroses and Psychoses. <i>Brothers, A. U., and Bennett, A. E.</i>	335
The Habit of Not Returning Books. <i>Bergler, E.</i>	340
The Menstrual Cycle and Recovery During Shock Treatment. <i>Michael, S. T.</i>	342
Effect of Electrically Induced Convulsions upon the Opossum. <i>Ritchie, J. A., and Lowenbach, H.</i>	348

Orbital Undercutting in the Treatment of Psychoneuroses, Depressions and Senile Emotional States

1. Presentation is made of 47 cases of intractable psychoneuroses, depressions and senile emotional states undergoing undercutting of the orbital cortex of the frontal lobes.

2. The undercutting operation permits precise sectioning under direct vision of a measured extent of cortical connections and can be exactly duplicated in successive cases.
3. When limited to the orbital cortex, there is no appreciable late blunting of personality even in the elderly.
4. Eighty-seven per cent. of the patients have shown significant improvement with a gratifying diminution of anxiety, tension and obsessive thinking, a lift in mood, and a lessening of visceral consciousness.
5. Optimum results have unexpectedly occurred in the older age group, sufficient to warrant a separate report.
6. Operation may uncover an underlying schizophrenia in pseudo-neurotic schizophrenic patients.
7. Physiologic observations are made on the functions of the extreme posterior portion of the orbital cortex.

(Author's Abstr.)

DECEMBER

- Rhythmic Sensory Bombardment Therapy. *Lovett Doust, J. W., and Schneider, R. A.* 357
 The Role of Psychic Phenomena in Mental Disease. *Radzinski, J. M.* 370
 Integration of Shock Treatments and Psychosurgery in Schizophrenia. *Kalinowsky, L. B.* 377

VOL. 6

EEG CLIN. NEUROPHYSIOL.

AUGUST, 1954

- Steady Potential Gradients in Experimental Cerebral Vascular Occlusion. *Kempinsky, W. H.* 375
 *Comparison of Electrographic Effects of Stimulation of the Amygdala and Brain Stem Reticular Formation in Cats. *Feindel, W., and Gloor, P.* 389
 *Subcortical Electrical Activity in the Golden Hamster during Arousal from Hibernation. *Chatfield, P. O., and Lyman, C. P.* 403
 The Electroencephalogram of the Cat's Brain at Temperatures Between 40°C. and 20°C. *Gaenshirt, H., et al.* 409
 *The Electroencephalogram as Modified by Afferent Impulses. *Cooke, P. M., and Snider, R. S.* 415
 *The Effect of Introduction of Some Drugs into the Cerebral Ventricles on the Electrical Activity of the Brain of Cats. *Cooke, P. M., and Sherwood, S. L.* 425
 *EEG Changes during Cinematographic Presentation. *Gastaut, H.* 433
 Clinical Significance of the Photomyoclonic Response in Psychiatric Patients. *Shagass, C.* 445
 Parietal Focal Theta Rhythm. *Cobb, W., and Muller, G.* 455
 The EEG in Essential Hypertension and Chronic Cerebrovascular Disease. *Roberts, J. A., and Walker, M.* 461
 The EEG Effects of Carotid Compression. *Kidron, D. P.* 469
 *The Role of Frequency Selective Reverberatory Nets in Cerebral Function. *Brady, J. S.* 473
 The Classification of Signals in the Nervous System. *Utley, A. M.* 479

Comparison of Electrographic Effects of Stimulation of the Amygdala and Brain Stem Reticular Formation in Cats

1. A comparison of the electrographic effects of stimulation of the amygdaloid nucleus and the brain stem reticular formation was made in 15 cats under Nembutal anaesthesia.
2. Stimulation of the amygdala can produce a diffuse electrographic effect consisting of a low voltage, fast, asynchronous activity, having all the characteristics of the "arousal" pattern as produced by stimulation of the brain stem reticular formation. During such a response the barbiturate spindles are blocked and abnormal activities such as delta waves and strychnine spikes may be eliminated. A more restricted activation confined to certain cortical areas, particularly the temporal and sensori-motor cortex, is sometimes produced and more often from the amygdala than from the brain stem reticular formation.
3. The electrical activity of the amygdala itself is activated in an identical way by stimulation of the reticular formation or of the opposite amygdala. This effect consists mainly in the production of a fast rhythmical type of activity, occurring often in spindles, which may represent the arousal pattern of the amygdala. This effect may occur with or without generalized cortical activation.
4. Although it is as yet not possible to ascribe this activation effect to a stimulation of any particular nuclear sub-division of the amygdaloid complex, it seems clear that this effect is not obtainable from the whole amygdaloid complex, nor does it necessarily involve those nuclei receiving direct olfactory connections.
5. These experimental results suggest that the amygdala, like the brain stem reticular formation and the intralaminar system of the thalamus, represents a structure capable of exerting diffuse regulatory effects on other cerebral regions.
6. The role of the amygdala in epileptic automatism is discussed in the light of these findings.

(Authors' Abstr.)

- Subcortical Electrical Activity in the Golden Hamster during Arousal from Hibernation*
1. Results of a systematic electrical exploration of cerebral hemispheres and brain stem in golden hamsters (*Mesocricetus auratus*) arousing from hibernation are presented.
 2. Three types of subcortical electrical activity were recorded during the process of arousal, namely (a) transient, regular, initially 17/sec. activity, (b) fairly continuous waves, and (c) activity in bursts.
 3. The electrical activity recorded was confined to components of the limbic system and its presumed descending efferents. Olfactory bulbs, corpus striatum, thalamus, and anterior hypothalamus were conspicuously quiescent.
 4. These findings appear consistent with contemporary theories of the function of the limbic system and would serve to account for the apparent agitated state of the hamster immediately upon full arousal from hibernation.
 5. It is concluded that the process of arousal in the golden hamster is initiated when the limbic system is activated either directly or indirectly by afferent impulses from the periphery.
- (Authors' Abstr.)

- The Electrocerbellogram as Modified by Afferent Impulses*
- This study on the electrocerbellogram is primarily concerned with frequencies of less than 60/sec. (thus excluding the better-known 300/sec. activity) which can be recorded on the average EEG equipment and especially modifications of these slow frequencies by various afferent stimuli.
1. Slow frequencies can be observed in the cerebellum of unstimulated animals, in its nuclei, and its outflow.
 2. They are not uniform in all regions, not always transmitted through to the outflow and often resemble activity appearing concurrently in the cerebral cortex.
 3. Many of the slow frequencies are abolished by high decerebration.
 4. Stimulation of various cerebral areas, various peripheral nerves or an afferent peduncle to the cerebellum alters the electrocerbellogram.
 5. Repeated tonic-like photic and auditory stimulation alters these waves, but not always in a uniform manner since either high voltage irregular slow waves or uniform fast waves may occur during or following such stimulation.
 6. Single stimuli whether electrical, single click, or single flash usually produce one or more sharp spikes followed by a slow wave recorded from the cerebellar cortex. Likewise, spikes of similar appearances (different latency) occur in a cerebellar outflow, i.e. brachium conjunctivum. The slow wave usually does not appear in the brachium conjunctivum, but when present, its form commonly varies from that recorded at the cortical surface.
- (Authors' Abstr.)

- The Effect of Introduction of Some Drugs into the Cerebral Ventricles on the Electrical Activity of the Brain of Cats*
- The electrographic changes following the injection of acetylcholine, carbachol, eserine, atropine and cholinesterase into the cerebral ventricles of cats are described.
1. The effect of several drugs in the cerebral ventricles of the cat on the electrical activity of its brain in a series of 23 animals is described. Some of the complex relations of the activities of periventricular grey and of other areas of brain stem are indicated and the incompatibility of their rhythmic activity with their transmission of information has been discussed.
 2. Acetylcholine, carbachol and eserine produce rhythmic, fast activity in the periventricular areas and spindles resembling the "recruitment" response in the larger nuclear masses, the white matter and the cortex.
 3. This action can be reversed with cholinesterase and is depressed by atropine.
 4. Cats with a lesion between the mammillary bodies and the nuclei rubri do not show this response, but will show spindles, under the influence of intraventricular atropine.
- (Authors' Abstr.)

- The Role of Frequency Selective Reverberatory Nets in Cerebral Function*
- A possible neurological basis for visual discriminator mechanisms was described on the basis of prior work utilizing rhythmic photic stimulation. It was suggested, as a working hypothesis, that discriminator mechanisms employ frequency selective reverberatory nets of neurons which when activated produce specific behavior patterns. An experimental evocation of a GSR, which had been conditioned to color was accomplished by means of photic stimuli flickering at appropriate rates. Clusters of responses appeared at frequencies within which color illusions had been reported by the subjects and at approximate multiples and sub-multiples of these frequencies. The response patterns obtained supported the hypothesis that there is, in fact, a frequency selective mechanism associated with visual discrimination. Some further hypotheses with regard to the electroneural correlates of visual learning were suggested.
- (Author's Abstr.)

VOL. 35

INTERNAT. J. PSYCHOANAL.

1954

- Analytic Synesthesiology. *Deutsch, F.* 293
 Object-Relation Changes in the Analysis of a Fetishist. *Hunter, D.* 302
 The Psychology of Poise. *Rangell, L.* 313
 The Analysis of an Adult Nail Biter. *Rosow, H. M.* 333
 The Analysis of an Unconscious Pinocchio Fantasy in an Obsessional Neurosis. *Silverman, D.* 346
 Psycho-analysis and the History of Art. *Gombrich, E. H.* 401
 Regulatory Devices of the Ego Under Major Stress. *Menninger, K.* 412
 Rehearsal and Collusion. *Rowley, J. L.* 421
 The Re-integration of a Wish, a Dream and an Error. *Dorn, R. M.* 428

VOL. 49

J. AB. SOC. PSYCHOL.

OCTOBER, 1954

- Prediction of Flying Success by Clinical Analysis of Test Protocols. *Holtzman, W. H., and Sells, S. B.* 485
 The Influence of Set on Semantic Generalization. *Eisen, N. H.* 491
 Conditioning Level in the Behavior Disorders. *Taylor, J. A., and Spence, K. W.* 497
 The Role of Expectancy in the Performance of Posthypnotic Behavior. *Fisher, S.* 503
 Self-Perception, Perceptual Defense and Adjustment. *Chodorkoff, B.* 508
 An Experimental Investigation of the Effect of Unstable Interpersonal Relations in a Group. *Festinger, L., and Hutte, H. A.* 513
 Projection and Displacement. *Wright, G. O.* 523
 A Movement Interpretation of Threat. *Landfield, A. W.* 529
 The Color-Form Responses of Normal Psychotic and Neurotic Subjects. *Keehn, J. D.* 533
 Anxiety and the Mode of Response. *Silverman, R. E.* 538
 An Analysis of the Cattell-Luborsky Humor Test into Homogeneous Scales. *Yarnold, J. K., and Berkeley, M. H.* 543
 Tactual Perception of Form by the Brain-injured. *Ross, A. O.* 566

VOL. 49

J. AB. SOC. PSYCHOL., SUPPT.

OCTOBER, 1954

- Psycholinguistics. A Survey of Theory and Research Problems 1-203

VOL. 10

J. CLIN. PSYCHOL.

OCTOBER, 1954

- The Skills of Clinicians in Analysis of Projective Tests. *Holsopple, J. Q., and Phelan, J. G.* 307
 The Differentiation of Well and Poorly Integrated Clinicians by the Q-sort Method. *Segal, J.* 321
 An Analysis of Some Clinical Judgments on Male Basic Airmen who Failed the Group Psychological Tests. *Jenson, M. B., and Schmid, J.* 325
 Individual Bias in Psychological Reports. *Robinson, J. T., and Cohen, L. D.* 333
 Some Factors in Self-Judgments. *Mason, E. P.* 336
 The Relationship of Certain Personality Factors to Prognosis in Psychotherapy. *Rosenberg, S.* 341
 Ethnocentric Attitude Changes and Rated Improvement in Hospitalized Psychiatric Patients. *Rosen, E.* 345
 The Effects of Attitude toward Authority on Psychotherapy. *Dana, R. H.* 350
 Some Notes on Psychology in Germany 1953. *Zuckerman, S. B.* 353
 A Validation Study of the Taylor Manifest Anxiety Scale. *Hoyt, D. P., and Magoon, T. M.* 357
 A Qualitative Analysis of the Vocabulary Responses of Institutionalized, Mentally Retarded Children. *Papama, N.* 361
 A Transposed Analysis of the Bender-Gestalts of Brain Disease Cases. *Guertin, W. H.* 366
 The Bender Gestalt Visual Motor Test as a Culture Free Test of Personality. *Peixotto, H. E.* 369
 Rating Scale Technique Applied to Rorschach Responses. *Baker, L. M., and Creager, J. A.* 373
 Comparison of the Grassi Block Substitution Test with the Wechsler-Bellevue in the Diagnosis of Organic Brain Damage. *Placek, J. E., and Young, F. M.* 375
 Ammons and Wechsler Test Performances of College and Psychiatric Subjects. *Allen, R. M., and Thornton, T. E.* 378
 A Study of the Reliability of an Alternate Form for the Shipley-Hartford Abstraction Scale. *Horlick, R. S., and Monroe, H. J.* 381
 A Modification of the Index of Profile Similarity. *Du Toit, J. M.* 384
 The Hastings Short Form of the Group MMPI. *Olson, G. W.* 386
 Schizophrenic Ideation as Striving Toward the Solution of Conflict. *Boisen, A., and Jenkins, R. L.* 389
 A Note on Rigidity and Length of Institutionalization. *Solomon, P.* 391
 Note on an Experimental Scoring System for Insight Test. *Fassett, K. K.* 393

VOL. 101

J. COMP. NEUR.

AUGUST, 1954

Anatomical Overlap of Motor Units. <i>Feindel, W.</i>	1
Structural and Functional Organization of Mammalian Cerebral Cortex. <i>Tower, D. B.</i> ..	19
The Chemical Morphology of the Retina. <i>Wislocki, G. B., and Sidman, R. L.</i> ..	53
Connections of the Cerebral Cortex. II. <i>Krieg, W. J. S.</i>	101
An Anatomical and Experimental Study of the Cerebellar Nuclei and their Efferent Pathways in the Monkey. <i>Rand, R. W.</i>	167
*An Unusual Structure in the Floor of the Fourth Ventricle of the Golden Hamster. <i>Chatfield, P. O., and Lyman, C. P.</i>	225

OCTOBER

The Dorsal Trigemino-thalamic Tract in the Cat Reconsidered as a Lateral Reticulo-thalamic System of Connections. <i>Russell, G. V.</i>	237
On the Relation of the Hippocampal-fornix System to the Control of Rage Responses in Cats. <i>Rothfield, L., and Harman, P. J.</i>	265
The Cytology of the Subcommissural Organ, etc. <i>Wislocki, G. B., and Leduc, E. H.</i> ..	283
On the Three Types of Auerbach's Nerve Plexus. <i>Ikedo, T.</i>	311
Regeneration of the Spinal Cord of the Chick. <i>Clearwaters, K. P.</i>	317
Implantation of Electrical Energy by Paired Half-centers as Revealed by Structure and Function. <i>Gesell, R., et al.</i>	331
Neurohistological Basis for the Functioning of Paired Half-centers. <i>Ritzlaff, E.</i> ..	407
The Inferior Olive in Birds. <i>Vogt-Nielsen, L.</i>	447
The Development of the Cortico-spinal Tract in the Pouch-young of the Virginia Opossum <i>et al. Ward, J. W.</i>	483
Effects of Vagal Stimulation on the Distribution of Chromatin in the Cells of the Intracardiac Ganglion. <i>Hamaty, D., and Truex, R. C.</i>	495
The Origin of Intrinsic Ganglia of Trunk Viscera from Vagal Neural Crest in the Chick Embryo. <i>Yntema, C. L., and Hammond, W. S.</i>	575
<i>An Unusual Structure in the Floor of the Fourth Ventricle of the Golden Hamster (Mesocricetus auratus)</i>	

The floor of the 4th ventricle of the golden hamster (*Mesocricetus auratus*) discloses an ependymal invagination over which lies a mass of neural tissue which we have designated the locus incertus. This tissue, which appears to be an exaggeration of the central grey, contains a large celled nucleus and sends fibers to, or receives fibers from, the mesencephalic tegmentum and the interpeduncular nucleus. The area receives collaterals of the lemniscus systems, and presumably descending fibers of the dorsal longitudinal fasciculus.

The locus has not been described in other hibernators, but is present in the muskrat (*Ondatra zibethica*) which belongs to the same family as the hamster (*Cricetidae*). It is postulated that the locus is a center concerned with central autonomic mechanisms.

(Authors' Abstr.)

VOL. 24

J. EDUC. PSYCHOL.

NOVEMBER, 1954

The Causes of Premature Leaving from Grammar Schools. <i>Collins, M.</i>	129
Psychology and the Teaching of Art. <i>Peel, E. A.</i>	143
Immediate Memory of a Broadcast Feature Programme. <i>Nias, A. H. W., and Kay, H.</i> ..	154
The Instruction of Children by Pictorial Illustration. <i>Vernon, M. D.</i>	171

VOL. 51

J. GEN. PSYCHOL.

JULY, 1954

Absolute Sensitivity to the Glutamic Taste. <i>Mosel, J. N., and Krantowitz, G.</i>	11
Paruresis. <i>Williams, G. W., and Degenhardt, E. T.</i>	19
The Effect of an Irrelevant Drive on the Reaction Tendency Specific to Another Drive. <i>Strange, J. R.</i>	31
Guide for Qualitative Research with the H-T-P. <i>Hammer, E. F.</i>	41
Fact, Law and Theory in Psychology. <i>Stafford, J. W.</i>	61
Negative Practice as a Psychotherapeutic Technique. <i>Lehner, G. F. J.</i>	69
The Satiational Theory of Figural After-effects. <i>Marquart, D. I.</i>	83
An Experimental Attempt to Produce Unconscious Manual Symbolic Movements. <i>Kroutt, M. H.</i>	93
An Experimental Attempt to Determine the Significance of Unconscious Manual Symbolic Movements. <i>Kroutt, M. H.</i>	121
A Statistical Analysis of the Electrodermal Response Employed in Lie Detection. <i>Guertin, W. H., and Wilhelm, P. L.</i>	153
An Experimental Verification of the Structural Nature of Set. <i>Wherry, R. J., and Rethlingshafer</i>	161

OCTOBER

Repetition Effect in Pain Threshold Determination. <i>Clausen, J., et al.</i>	185
An Empirical Study of the Flesch Formulae. <i>Bernberg, R. E.</i>	193
The Performance of Aphasic, Non-aphasic and Control Subjects on the Rorschach Test. <i>Reitan, R. M.</i>	199

The Application of the Constant Method in Determining Critical Flicker Frequency. Ricciuti, H. N., and Misiak, H.	213
Geographic Orientation in the Blind. Worchel, P., and McReynolds, J.	221
The Association Value of Nonsense Syllables which are Meaningful Words in Foreign Languages. Harris, G. E., and Sumner, F. C.	237
Relation Between the Sensitivity for Electrical Stimuli and Adaptation State of the Eye. Clausen, J., et al.	251
An Electronic Interval Timer for the Study of PHI. Taub, H., and Barmack, J. E.	261
Level of Aspiration Measures and College Achievement. Schultz, A. G., and Ricciuti, H. N.	267
Chromatic Perceptions of Achromatic Presentations. Newhall, S. M.	277
The Differential Satiability of Schizophrenic and Normal Subjects. Wertheimer, M.	291
Does Hullian Theory Provide the Adequate Foundations for a Comprehensive Theory of Human Behavior? Ginsberg, A.	301

VOL. 34

J. GENET. PSYCHOL.

JUNE, 1954

Genetic Differences in the Behavior of Dogs. Scott, J. P., and Charles, M. S.	175
Factors Associated with Repeating Among Preadolescent "Delinquents". Wattenberg, W. W.	189
Learning Theory and Identification	
I. Mowrer, O. H.	197
II. Seward, J. P.	201
III. Martin, W. E.	211
IV. Brodbeck, A. J.	219
V. Seward, G. H.	229
Child Rearing Practices and Child Care Resources used by Ohio Farm Families with Preschool Children. Hoefflin, R.	271

SEPTEMBER

Individual Differences in Child Kaleidoblock Responses. Ames, L. B., and Learned, J.	3
A Comparison of Parent Judgments and Child Feelings Concerning the Self Adjustment and Social Adjustment of Twelve-year-old Children. Langford, L. M., and Alm, O. W.	39
On the Theories and Problems of Adolescence. Luchins, A. S.	47
Increased Reliabilities, New Keys and Norms for a Modified Kwalwasser-Dykema Test of Musical Aptitudes. Holmes, J. A.	65
Testing Homogeneity of Reliability Co-efficients When Spit-half and Test-retest r's are to be Combined. Jeeves, T. A.	75
The Effect of Instructions and Item Order on the Arithmetic Subtest of the Wechsler-Bellevue. Guertin, W. H.	79
Attitude as a Conditioner of the Acquisition of New Facts Among Eighth Grade Pupils. Mannello, G.	85
A Study of Visual Illusions in the Monkey. Dominguez, K. E.	105
Secondary Reinforced Behavior in an Operant Situation Among Dogs. James, W. T.	129
Continued Longitudinal Rorschach Study of a Child for Years Three to Five. Allen, R. M.	135

VOL. 119

J. NERV. MENT. DIS.

MAY, 1954

Nor-Epinephrine-like and Epinephrine-like Substances and the Elevation of Blood Pressure during Acute Stress. Funkenstein, D. H., and Meade, L. W.	380
A Study of the Effectiveness of Drug Therapy in Parkinsonism. Kaplan, H. A., et al.	398
Prepsychotic Personality Traits in Manic-Depressive Disease. Rowe, C. J., and Daggett, D. R.	412
Induction of Sleep by Autonomic Drugs. Hoffer, A.	421
An Active Treatment Program for Chronically Ill Mental Patients. Chafetz, M. E.	428
An Unusual Familial Cerebellar Syndrome. Pappworth, M. H., and O'Mahony, P. F.	437
BAL Therapy in Infectious and Metabolic Neuropathies. Furmanski, A. R.	441

JUNE

Dementia Infantilis. Hulse, W. C.	471
ECT in the Presence of Physical Defects. McKnight, W. K., et al.	478
Schizophrenia. Fischer, R.	492
A Contribution to the Psychobiologic Approach in Schizophrenia. Guttmann, O.	498
The Menstrual Cycle and Insulin Coma Treatment in Schizophrenia. Merlis, S., and Michael, S. T.	512
Laughing Spells in Patients after Lobotomy. Kramer, H. C.	517
MMPI Patterns before and after CO ₂ Inhalation Therapy. Simon, W., and Gilberstadt, H.	523
Duration of Convulsion in ECT. Finner, R. W.	530
Observations on Shock Therapy. Negrin, J., jun.	538

VOL. 120

JULY-AUGUST

Toxemia of Pregnancy and Schizophrenia. <i>Wiedorn, W. S.</i>	1
The Ganser Syndrome in Psychoses. <i>Lieberman, A. A.</i>	10
Psychodynamics of Chronic Allergic Eczema and Chronic Urticaria. <i>Schneider, E.</i> ..	17
The Action of Piromen on Certain Neuropathologic States. <i>Rosner, S.</i>	22
Denial of the Loss of a Limb. <i>Weinstein, E. A., et al.</i>	27
EEG and Psychometric Testing in Brain-damaged Patients. <i>Silverman, A. J., and Harris, V. W.</i>	31
A Biological Concept of Neurosis Origin and Process. <i>Stein, S. I.</i>	35
Psychodynamic Factors in Atropine Toxicity Therapy. <i>Forrer, G. R.</i>	40
The Use of a Stable Sodium Amytal Solution in a General Psychiatric Hospital. <i>Congdon, E. D., and Merles, S.</i>	44
Abstinence, Rebound and Readjustment. <i>Meerloo, J. A. M.</i>	46
Similarity of Socializing Interests as a Factor in Selection and Rejection of Psychiatric Patients. <i>Morimoto, F. R., and Greenblatt, M.</i>	56
Minor Neurologic Signs and Symptoms Following Insulin Coma Therapy. <i>Ziegler, D. K.</i>	75
Rarity of Concurrence of Psychosis and Rheumatoid Arthritis in Individual Patients. <i>Trevathan, R. D., and Tatum, J. C.</i>	83

SEPTEMBER-OCTOBER

Clinical and EEG Studies on Effect of Mescaline, etc. <i>Wikler, A.</i>	157
Hepatolenticular Degeneration. <i>Naskin, N., and Mackenzie, J.</i>	176
The Course of Wartime Schizophrenia Compared with a Control Group. <i>Ripley, H. S., and Wolf, S.</i>	184
Further Immunological and Clinical Studies on Importance of Neurotrophic Streptococci, etc. <i>Rosenow, E. C.</i>	196
Social Behavior and Autonomic Physiology. <i>Boyd, R. W., and Di Mascio, A.</i>	207
Effects of ECT on Personality and Intellect of Schizophrenic Child. <i>Gurevitz, S., and Helme, W. H.</i>	213
The Social Adjustments of Fifty Patients, etc. <i>Wells Goodrich, D., et al.</i>	227
Psychiatric Potentialities of Art. <i>Gianascol, A.</i>	238
The Problem of Liver Function in Schizophrenia. <i>Smith, S.</i>	245
Psychosomatic Study of Case of Palindromic Rheumatism. <i>Ameen, L.</i>	253
Gestalt Psychology as Applied to Language Disturbances. <i>De Hirsch, K.</i>	257
Schizophrenia in Twins One of Whom was Lobotomized. <i>Weatherly, J., and Deabler, H.</i>	262
Psychoses due to Amphetamine. <i>Herman, M., and Nagler, S. H.</i>	268
Recurrent Dreams in Migraine. <i>Lippman, C. W.</i>	273
Some Psychosomatic Considerations in Dystrophia Myotonica. <i>Wallerstein, R. E., and Rubin, S.</i>	277
Preliminary Evaluation of Novaldin and Serum Albumin, etc. <i>Jameson, G. K., and Ford, H.</i>	282
Television Addiction and Reactive Apathy. <i>Meerloo, J. A. M.</i>	290

VOL. 17

J. NEUR. NEUROSURG. PSYCHIAT.

NOVEMBER, 1954

Focal Cerebral and Cerebellar Atrophy in a Human due to Organic Mercury Compounds. <i>Hunter, D., and Russell, D. S.</i>	235
The Absorption and Excretion of Radiocopper in Hepato-lenticular Degeneration. <i>Matthews, W. B.</i>	242
Adrenaline and Noradrenaline in Cerebrospinal Fluid. <i>Weil-Malherbe, H., and Liddell, D. W.</i>	247
*The Treatment of Manic Psychoses by the Administration of Lithium Salts. <i>Schou, M., et al.</i>	250
The Sequelae and Short-term Prognosis of Attempted Suicide. <i>Batchelor, I. R. C., and Napier, M. B.</i>	261
The Effect of Temporal Lobectomy upon Two Cases of an Unusual Form of Mental Deficiency. <i>Liddell, D. W., and Northfield, D. W. C.</i>	267
Pathological Findings in Temporal Lobe Epilepsy. <i>Meyer, A., et al.</i>	276
The Reticular Perivascular Tissue of the Central Nervous System. <i>Millen, J. W., and Woollam, D. H. M.</i>	286

The Treatment of Manic Psychoses by the Administration of Lithium Salts

The effect of lithium salts on manic psychoses has been tested in a controlled experiment. During treatment the patients were under close clinical observation, and the effects of suggestibility were minimized by an alternation between periods of lithium and placebo administration; neither the patients nor the observers were told whether the tablets given contained lithium or were placebos. The effect of the treatment was evaluated with due consideration of the spontaneous course of the disease in each case.

Thirty-eight manic patients were treated. The response of 14 patients was classified as "+effect"; in these cases it was highly improbable that the changes occurring during the treatment were due to spontaneous variations. Eighteen patients were grouped under the heading "possible effect"; the condition was improved during lithium administration but a spontaneous cessation of the mania could not be excluded. In six patients lithium treatment did not influence the mania beneficially; these were classified as "-effect".

The therapeutic doses of lithium varied usually between 24 and 48 mEq. per day. On the higher dosage symptoms of slight intoxication were seen in some cases, the most frequent toxic symptoms being nausea and vomiting, diarrhoea, tremor of the hands, a feeling of general fatigue, and slight drowsiness. The symptoms of intoxication disappeared in three to four days when lithium administration was stopped.

Serum lithium levels were usually between 0.5 and 2.0 mEq./l during treatment; the lithium content of the spinal fluid was considerably lower. In some patients lithium treatment gave rise to slight, reversible changes in the E.E.G.; in a single patient transient inversions of the T waves in the electrocardiogram were observed during the treatment.

It is concluded that lithium administration may be of considerable therapeutic value in a number of manic cases, but the danger of lithium intoxication necessitates a careful clinical and biochemical control.

Finally it is pointed out that the beneficial effect of lithium in cases of mania appears to offer new possibilities for a study of the pathophysiology of the manic-depressive psychoses.

(Authors' Abstr.)

VOL. 13

J. NEUROPATH. EX. NEUROL.

1954

Relationship of Neuropathology to Neurology, Psychiatry and Pathology. <i>Ferraro, A.</i>	509
The Cerebellar Projection of the Peri-Hypoglossal Nuclei in the Cat. <i>Torvik, A., and Brodal, A.</i>	515
*Patterns of Vascular Failure in the Central Nervous System. <i>Mettler, F. A., et al.</i>	528
Tumors of the Pineal Region. <i>Ringertz, N., et al.</i>	540
*Histopathology of Catatonic States. <i>Scharenberg, K., and Brown, E. O.</i>	592
*Enzymatic Action of Fluids from Cystic Brain Tumors. <i>Spiegel-Adolf, M. and Wycis, H. T.</i>	601

Patterns of Vascular Failure in the Central Nervous System

Three patterns of vascular failure are recognized and discussed. They are: (1) failure in the area of anatomic distribution, (2) failure in areas which lie between territories of primary vascular distribution, and (3) failure in part of the terminal area of anatomic distribution. The first type of failure can only be encountered in the primary area of distribution of vessels in which either because of absence or disease little or no overlap or anastomosis exists. The second type of failure is encountered along the entire capillary edge of the primary distribution of a vessel which is usually located at a zone of transition where the arterial supply is shifted from one principal source of supply to another. In both of the preceding cases the nature of the ischemic defect can be accurately forecast from a knowledge of the anatomical distribution of the vessel in question. The third type of failure, which occurs in the area of distribution of a vessel which has some degree of overlap or anastomosis with another vessel cannot be accurately foretold by knowing only the anatomic distribution of the vessel. It is also necessary to know what anastomotic possibilities exist, and especially what shunts are available and operative. Post mortem material casts some light on the nature of the areas which fail but, since post mortem examinations are usually conducted in accordance with definite preconceived frames of reference, failures due to uncomplicated occlusions of vessels may be missed and only those instances picked up in which contributory pathologic changes have resulted in unusually large lesions which produce prominent clinical neurologic signs.

Surgical occlusion of the anterior chorioidal artery produces a smaller area of ischemia than one would expect from the pathologic literature. The focal area of necrosis is along the internal medullary lamina of the lentiform nucleus. In larger lesions the enlargement occurs caudally into the internal segment of the pallidum and next into the adjacent portion of the internal capsule and dorsolateral part of the internal segment of the pallidum. The escape from ischemia of a large portion of the internal capsule and internal segment of the pallidum (which usually are colored by injection masses) appears to be due to anastomoses between branches of the posterior communicating and anterior chorioidal arteries as these lie on the cerebral peduncle and optic tract. Similar anastomoses exist between the anterior chorioidal and posterior cerebral arteries and are evidently responsible for some of the sparing of the internal capsule and for the sparing of the visual system. Where, because of pre-existing vascular disease, such anastomotic channels are affected, much more extensive effects will, of course, follow ligation of the vessel. Most clinical cases diagnosed as "syndrome of the anterior chorioidal artery" have probably occurred in patients who have also suffered from generalized cerebral vascular disease. Probably many cases which have thromboses of the anterior chorioidal artery fail to show what have been considered typical signs. Consequently, such cases may not be diagnosed and attention may not be directed to this vessel if death should occur from other causes.

(Authors' Abstr.)

Histopathology of Catatonic States

The patho-physiologic conditions under which astroglia is transformed into ameboid forms can be determined in human neurosurgical material under conditions approximating those of an experiment: 72 hours after surgical trauma (trephine), the wound is surrounded by 3 histologically well defined areas of activated cells: (a) the zone closely adjacent to the wound contains only remnants of proliferated and completely destroyed cells; (b) in the second zone adjacent to the first, the astroglia is in a state of ameboid and pre-ameboid degeneration; and (c) in the third zone, some distance from the wound, the astrocytes are hypertrophic, proliferated and well preserved. The subsequent organization is carried out by the elements of this outer zone. The interpretation of these findings is not difficult: the irritation caused by the acute focal destruction of the tissue is most severe in the areas adjacent to the wound where the acutely irritated astrocytes disintegrate within a few hours; in the second, less traumatized zone, the astroglia is able to produce hypertrophic forms but the effect of the trauma is still very strong and the cells suffer clasmotodendrosis within a short time; in the third zone the astroglia is sufficiently stimulated to respond in an organized manner. The observations in neurosurgical material, in which the time factor is exactly known, prove that the ameboid degeneration can develop within a few hours, that it occurs only in previously irritated glia, and that the histologic character of the reaction is determined by the acuteness of the trauma. The latter is, obviously, very strong in acute fatal catatonia and is much milder in its chronic forms; this may account for the clinical course.

The etiology remains obscure, but certain considerations should be mentioned. The ameboid degeneration appears frequently in severe disorders of metabolism, such as uremia, diabetes mellitus, in chronic toxic conditions (ulcerative colitis), in infectious diseases, and many others. This seems to suggest a profound disturbance of metabolism in catatonic states.

(Authors' Abstr.)

Enzymatic Action of Fluids from Cystic Brain Tumors

Enzymatic action against nucleic acids and most of their pyrimidine and purine derivatives has been demonstrated spectrophotometrically and against tigroid bodies histologically in the fluids of various cystic brain tumors. The enzymatic activities are heat labile and inactivated by Mg salts. A group of tumors (craniopharyngioma, and gliomas) could be differentiated in which cyst formation was associated with definite enzymatic activity against nucleic acids and tigroid bodies, while such an activity was absent in a cystic acoustic neurinoma. This seems to suggest that various mechanisms may be responsible for cyst formation in tumors, one of which is destruction of cells by enzymatic products originating in the tumor metabolism.

(Authors' Abstr.)

VOL. 14

1955

The Role of Neuropathology in Modern Anthropology. <i>Benda, C. E.</i>	1
The Phosphatases of the Nervous System. <i>Feigin, I., and Wolf, A.</i>	11
Cholinesterases of the Central Nervous System. <i>Koelle, G. B.</i>	23
Dynamic Neuropathology. <i>Pomerat, C. M.</i>	28
Application of Quantitative Histochemical Methods to the Study of the Nervous System. <i>Pope, A.</i>	39
Oxidases and Peroxidases of the Central Nervous System. <i>Roizin, L.</i>	47
Quantitation of Phosphorus Compounds in the Normal and Pathologic Human Brain. <i>Cohen, M. M.</i>	70
Transventricular Adhesions in Association with Birth Injury of the Caudate Nucleus. <i>Norman, R. M., and McMenemey, W. H.</i>	84
Stereotaxic Displacement of Portion of the Choroid Plexus in the Rhesus Monkey. <i>Mettler, F. A., et al.</i>	92
Fat Formation and Foam Cells Following Injection of Brain Tissue into the Cornea. <i>Cogan, D. G., and Kuwabara, T.</i>	95

VOL. 17

J. NEUROPHYSIOL.

1954

Unit Activity in Spindle Bursts. <i>Verzeano, M., and Calma, I.</i>	417
Localisation of Cerebral Electrical Activity. <i>Perl, E. R., and Casby, J. U.</i>	429
Organization of Stretch Reflex into Two Types of Direct Spinal Arcs. <i>Cohen, L. A.</i>	443
Action Potentials from Individual Elements in Cat Geniculate and Striate Cortex. <i>Tasaki, I., et al.</i>	454
*Autonomic Hypothalamic Outbursts Elicited by Cerebellar Stimulation. <i>Zanchetti, A., and Zoccolini, A.</i>	475
*Cerebellar Projection of Paramedian Reticular Nucleus of Medulla Oblongata in Cat. <i>Brodal, A., and Torvik, A.</i>	484
*Consequences of Cortical Convulsive Activity in the Rabbit. <i>Van Harreveld, A., and Stamm, J. S.</i>	505
Surface Movements of Click Responses from Acoustic Cerebral Cortex of Cat. <i>Lilly, J. C., and Cherry, R. B.</i>	521
*Hippocampal Electrical Activity in Arousal. <i>Green, J. D., and Ardiuni, A. A.</i>	533
Mechanisms of Activation and Motor Control of Stretch Receptors in Lobster and Crayfish. <i>Kuffler, S. W.</i>	558
Unit Activity in Reticular Formation and Nearby Structures. <i>Amassian, V. E., and De Vito, R. V.</i>	575

Autonomic Hypothalamic Outbursts elicited by Cerebellar Stimulation

1. Somatic and autonomic outbursts of sham rage were observed in the thalamic cat (i) during cerebellar stimulation or (ii) immediately thereafter as a rebound effect. The struggling movements sometimes concealed the classic postural responses. The postural reactions persisted unmodified when the thalamic cat deteriorated, although sham rage outbursts were no longer elicited by cerebellar stimulation and only localized autonomic responses were observed.

2. Histological controls showed that the rostral and central parts of the fastigial nuclei yielded sham rage outbursts during stimulation, whereas the rebound effects were elicited from midline fibers between the posterior parts of the roof nuclei and from the buried folia of tuber, pyramis and uvula.

3. The cerebellar origin of these effects is shown by their abolition following histologically controlled destruction of the stimulated structures.

4. Diencephalic centers are essential since the responses were abolished by rostral mid-brain electrocoagulation. Anatomical and physiological evidence suggests that the cerebellar influence on diencephalic structures might be mediated over the ascending reticular formation. (Authors' Abstr.)

Cerebellar Projection of Paramedian Reticular Nucleus of Medulla Oblongata in Cat

In a previous publication (7) part of the median reticular formation of the medulla oblongata was outlined as a particular nucleus which was called the paramedian reticular nucleus. It consists of three small cell groups and is found in the space between the hypoglossal root fibers, the raphe and the inferior olive, at the level of the middle third of the olive. Following decerebellations practically all cells of this nucleus (large, medium-sized and small ones) disappear, showing that it projects on to the cerebellum. More than half of its cerebellar connections are uncrossed.

In the present paper the occurrence of retrograde cellular changes in this nucleus has been studied following lesions of restricted parts of the cerebellum. Only cells presenting fully developed alterations have been considered positive.

By this method all three groups of the paramedian reticular nucleus are found to send fibers to the anterior lobe, the pyramis and uvula; probably some fibers pass also to the lobulus c_2 of Bolk. No evidence is found of connections with the cortex of the anso-paramedian lobe, the flocculus and paraflocculus or the dentate nucleus. It is likely, but has not been conclusively demonstrated, that the nucleus fastigii receives fibers from it.

The paramedian reticular nucleus is situated close to the areas of the reticular formation outlined by physiological methods as the inhibitory center for motor activities, but the nucleus does not appear to belong to this center proper (7). The cerebellar projection determined in the present study lends support to the assumption that the paramedian reticular nucleus, although not part of this center, is functionally closely related to it.

(Authors' Abstr.)

Consequences of Cortical Convulsive Activity in the Rabbit

Faradic stimuli of sufficient strength to produce after-discharges were applied to the exposed cortices of rabbits. As the strength of stimulation was increased the following phenomena were observed: (a) the weakest stimuli elicit no after-discharge, although a spreading depression may develop; (b) an after-discharge, observed near the stimulating electrodes, may be accompanied by a small, non-propagated, slow potential change (s.p.c.); (c) an after-discharge develops, accompanied by a larger (s.p.c.) which is propagated to more distant electrodes as the concomitant of a spreading depression; (d) after-discharges accompanied by large (s.p.c.), are recorded in electrodes at considerable distance from the stimulating electrodes. Support was found for the thesis that the (s.p.c.) concomitant with the spreading depression, the large (s.p.c.) accompanying an after-discharge, and the small non-propagated (s.p.c.) are all based on identical processes. The observation that an incision through the cortex between stimulating and recording electrodes prevents the spread of the after-discharge and accompanying (s.p.c.) supports the concept that the after-discharge acts as the stimulus for the (s.p.c.).

When preparations are in conditions favorable for eliciting spreading depressions the after-discharge was found to be followed by a depression of cortical activity, the post-convulsive depression. This post-convulsive depression may be transformed into convulsive activity by the same means which had been found to transform spreading depression into spreading convulsive activity, namely by several antecedent spreading depressions (elicited by d.c. stimulation), or by topical application of compounds with vasodilator action, such as pilocarpine and acetylcholine.

A convulsion produced by a Metrazol injection may also be followed by a post-convulsive depression accompanied by a slow potential change. When injection of this drug had been preceded by several spreading depressions a prolonged convulsion was observed.

In the rabbit the post-convulsive depression may be considered as a protective device—it is initiated by electrically or chemically produced convulsive activity, and limits the convulsions to relatively short periods.

(Authors' Abstr.)

Hippocampal Electrical Activity in Arousal

The electrical activity of the hippocampus has been studied in unanesthetized rabbits, cats and monkeys, immobilized either by tubocurarine or by transection through the midbrain. Observations have also been made in rabbits and monkeys with electrodes chronically implanted in the brain.

Arousal or desynchronization of the neocortical record, whether induced by any one of a variety of afferent stimuli or by direct excitation of the activating mechanism in the brain stem, is invariably associated with the concomitant appearance of an undulating series of large slow waves in the hippocampal record. This hippocampal response is induced by connections from the septum, in the dorsal fornix, and is conducted to the hypothalamus and thalamus through the fornix proper. It may be elicited in the absence of the neocortex, but is prevented by septal lesions, section of the dorsal fornix, or by anesthesia. It is possible to interpret this evoked wave sequence in the hippocampus as a specialized paleocortical arousal reaction, whose unusual pattern is somehow correlated with distinctive morphological or functional properties of this part of the brain.

Similarly inverse patterns of discharge in neocortex and hippocampus are frequently observed in records of spontaneous activity in wakefulness and sleep, however, the hippocampal record being synchronous when that of the neocortex is desynchronized and vice versa.

(Authors' Abstr.)

VOL. 18

Reflex Inhibition by Dorsal Root Interaction. <i>Howland, B., et al.</i>	1
Surface Movements of Figures in Spontaneous Activity of Anesthetized Cerebral Cortex. <i>Lilly, J. C., and Cherry, R. B.</i>	18
*Ascending Pathways Activating Thalamus of Cat. <i>Cohen, S. M.</i>	33
*Interaction Between Afferent and Cortically Induced Reticular Responses. <i>Hernandez-Peón, R., and Hagbarth, K-E.</i>	44
Cortical Localization of Taste in Albino Rat. <i>Benjamin, R. M., and Pfaffmann, C.</i>	56
Fibrillation and Hypersensitivity to A Ch in Denervated Muscle. <i>Luco, J. V., and Eyzaguirre, C.</i>	65
*Projections from Cortex to Cephalic Brain Stem in Monkey. <i>French, J. D., et al.</i>	74
*Respiratory Responses from Fornix and Wall of Third Ventricle in Man. <i>Segundo, J. P., et al.</i>	96

Ascending Pathways Activating Thalamus of Cat

1. This paper presents a study of the activating pathways afferent to the thalamus.
2. Thalamic activity is produced by ipsilateral afferent paths as well as contralateral.
3. The pathway for the earliest and largest activity in the thalamus derives from the medial lemniscus, which from the data presented here appears to have both crossed and uncrossed components.
4. While the latency between medullary and thalamic responses is longer for activation afferent from the brachial plexus than for activation afferent from the hind-limb nerves, the difference does not imply additional synaptic complexity in the pathway from the fore-limb to the thalamus. This difference is explicable on the basis that Group 1 fibers, which do not activate the thalamus, produce early activity at the nucleus cuneatus.
5. The existence in the thalamus of ipsilaterally and contralaterally evoked activity caused by different afferent pathways further supports the earlier findings that somatotopic localization in the ventral posterior nucleus of the thalamus is relatively poor.

(Author's Abstr.)

Interaction Between Afferent and Cortically Induced Reticular Responses

Interaction between afferent and cortically evoked reticular potentials was studied by employing single and repetitive trains of conditioning volleys. Unitary analysis of the interaction gave additional information concerning the degree of sharing of reticular neurones and the characteristics of their activation by incoming impulses.

1. The results indicate an extensive but not complete overlapping of reticulopetal pathways. Unit analysis showed partial sharing of reticular neurones for different incoming volleys and recruiting of reticular neurones by repetitive stimulation.
2. Both blocking and facilitatory interaction was demonstrated between two reticular responses. Evidence is presented that the blocking effect is due to occlusion and refractoriness of reticular neurones while the facilitation is due to a summation phenomenon in the subliminal fringe.
3. A long-lasting depression of afferent responses in the reticular formation occurs following cortical, subcortical or peripheral repetitive stimulation. This is mainly ascribed to occlusion or refractoriness, no conclusive evidence being found of active inhibition of reticular neurones.
4. Repetitive cortical and reticular stimulation was shown to cause a depression of an afferent test volley in the sensory trigeminal nucleus. It cannot be excluded that such a central influence upon specific sensory relays is partly responsible for the cortically induced depression of afferent reticular responses.

(Authors' Abstr.)

Projections from Cortex to Cephalic Brain Stem (Reticular Formation) in Monkey

1. Studies were made on 31 monkeys in which corticofugal pathways to the central cephalic brain stem were revealed by evoked potential and physiological neuronography techniques.

2. These corticofugal pathways were found to arise in the frontal oculo-motor area, cingulate gyrus, orbital surface of the frontal lobe, sensorimotor cortex, posterior parietal or para-occipital regions, and the superior temporal gyrus. Other regions of the cortical mantle were negative with respect to evoked potentials and strychnine spikes in the central cephalic brain stem.

3. The subcortical region to which these cortical loci were found to project corresponded to that previously identified as the reticular activating system and known to be implicated in the arousal response as elicited by peripheral sensory stimulation.

4. The evidence presented indicates that the same system of neurons which mediates this ascending arousal mechanism is itself under the influences of impulses descending in the corticofugal pathways described.

5. The physiological implications of these pathways between specific cortical zones and the reticular activating system are discussed.

(Authors' Abstr.)

Respiratory Responses from Fornix and Wall of Third Ventricle in Man

In a series of patients in which these structures were exposed at craniotomy, stimulation was applied to the columns of the fornix or the lateral wall of the third ventricle. Excitation of the fornix induced expiratory apnea and occasionally a clouding of consciousness. Stimulation of the wall of the third ventricle caused polypnea. The findings are discussed in the light of similar observations by others in man.

(Author's Abstr.)

VOL. 11	J. NEUROSURG.	JULY, 1954
Necrosis of Brain and Spinal Cord Following X-Ray Therapy. <i>Malamud, N., et al.</i> ..		353
Peripheral Collateral Circulation Between Cerebral Arteries. <i>Rosegay, H., and Welch, K.</i> ..		363
Delayed Brain Abscess in Relation to Retained Intracranial Foreign Bodies. <i>Drew, J. H., and Fager, C. A.</i> ..		386

SEPTEMBER

Pseudotumor Cerebri. <i>Zuidema, G. D., and Cohen, S. J.</i> ..		433
Controlled Transorbital Leukotomy. <i>Nosik, W. A.</i> ..		458
The Use of ACTH in Conjunction with Surgery for Neoplasms in the Parasellar Area. <i>Raaf, J., et al.</i> ..		463
Production of Focal Destructive Lesions in the Central Nervous System with Ultrasound. <i>Fry, W. J., et al.</i> ..		471

VOL. 38	J. PSYCHOL.	OCTOBER, 1954
Nutritional Replacement for Mental Illness. <i>Watson, G., and Comrey, A. L.</i> ..		251
The Effect of Figural Reproduction on Recognition. <i>Turner, M. B., and Craig, E. A.</i> ..		265
Self-dislike as a Determinant of Marked Ingroup-outgroup Preferences. <i>Brodbeck, A. J., and Perlmutter, H. V.</i> ..		271
Communication to High and Low Power Foreign and Domestic Authorities. <i>Perlmutter, H. V., and Hymovitch, B.</i> ..		281
Some Characteristics of the Xenophilic Personality. <i>Perlmutter, H. V.</i> ..		291
The Non-voter in 1952. <i>Hastings, P. K.</i> ..		301
A Further Study of Entoptic Stray Light. <i>Bartley, S. H., and Seibel, J. L.</i> ..		313
Motivation and Attention. <i>Stern, F., and Karson, S.</i> ..		321
Facilities of the Emory University Primate Behavior Laboratory. <i>Riopelle, A. J.</i> ..		331
A Further Examination of the Role of Autism in a Visual Figure-ground Relationship. <i>Jackson, D. N.</i> ..		339
Recall of Success and Failure as a Function of Subject's Threat Interpretations. <i>Gilmore, J. L.</i> ..		359
The Evaluation of Training and Transfer Programs in Terms of Efficiency Measures. <i>Lawrence, D. H.</i> ..		367
Research with Neuropsychiatric Samples. <i>King, G. F.</i> ..		383
The Multiplicity of the Normal Ego Structure. <i>Rosenman, S.</i> ..		389
Anxiety Level, Response Alternation and Performance in Serial Learning. <i>Hughes, J. B., et al.</i> ..		421
*Rorschach Scores in the Manic State. <i>Schmidt, H. O., and Fonda, C. P.</i> ..		427
The Relation of Size of Light to Auto-Kinetic Effect. <i>Luchins, A. S.</i> ..		439
Some Circumstances Surrounding Apparent Movement in the Line of Regard. <i>Bartley, S. H., and Miller, J. W.</i> ..		453
Performance on the Same Psychomotor Task under Different Stressful Conditions. <i>Parsons, O. A., et al.</i> ..		457

Dimensions of Color Vision. <i>Ekman, G.</i>	467
Response Bias in an Unstructured Questionnaire. <i>Berg, I. A., and Rapaport, G. M.</i> ..	475
Perceptual Adequacy in a Life Stress. <i>Korchin, S. J., and Basowitz, H.</i>	495
Anxiety in a Life Stress. <i>Basowitz, H., et al.</i>	503

Rorschach Scores in the Manic State

The Rorschach scores of 42 manics were compared with those of 42 schizophrenics, matched on the basis of age, sex, and total number of responses. The manics' scores were higher than the schizophrenics' for Sum C, Z, H, and M; they were lower for lambda, TIR, and TR. Comparison of the manics with Beck's normals showed the manics to be higher on Sum C, Z, W, Pure C, FC, and Y; they were lower on F + %, A%, lambda, P, V, and TIR. A number of hypotheses advanced by various writers were evaluated in the light of these empirical findings. Three of 12 hypotheses advanced by Rorschach were confirmed, and a consistent trend was noted in two others. Also confirmed were six of Beck's 12, four of Klopfer and Kelley's seven, and three of Phillips and Smith's five.

(Authors' Abstr.)

VOL. 40 J. SOC. PSYCHOL. AUGUST, 1954

Characteristics of Convicted Sex Offenders. <i>Ellis, A., et al.</i>	3
The Relation of Occupation Tolerance to Intelligence and Social Class Affiliation. <i>Sims, V. M.</i>	17
Experimentally Contrasted Social Atmospheres in Group Psychotherapy with Chronic Schizophrenics. <i>Singer, J. L., and Goldman, G. D.</i>	23
Lebanese Stereotypes of America as Revealed by the Sentence Completion Technique. <i>Prothro, E. T.</i>	39
The Influence of Contextual and Goal Restraints on the Meaningfulness of "Automatic Sentences". <i>Marks, M. R., and Taylor, W. L.</i>	43
Cross-cultural Patterns of National Stereotypes. <i>Prothro, E. T.</i>	53
Some Individual and Group Differences in Voting for Self. <i>Trent, R. D.</i>	61
The Internal Consistency of the Szondi "factors". <i>Gordon, L. V., and Lambert, E. J.</i> ..	67
A Comparison of Machover and TAT Interpretation. <i>Gallese, A. J., jun., and Spoerl, D. T.</i>	73
The Use of the Sentence Completion Test in Measuring Attitudinal Changes among College Freshmen. <i>Lindgren, H. C.</i>	79
The Effectiveness of Photographs as a Projective Device in an International Attitudes Survey. <i>Graham, M. D.</i>	93
Level of Aspiration as a Means of Discerning Between "in-prison" and "out-of-prison" Groups of Individuals. <i>Cassel, R. N., and Vanvorst, R.</i>	121
Ethnocentrism and the Self Concept. <i>Pearl, D.</i>	137
Level of Aspiration Phenomena in Small Groups. <i>Shelley, H. P.</i>	149
Size-distance Settings as Indicative of Personal Adjustment. <i>Smith, G. M.</i>	165

VOL. 19 J. SPEECH HEARING DIS. SEPTEMBER, 1954

Post-operative Velo-pharyngeal Movements in Cleft Palate Cases. <i>Buck, McK.</i>	288
An Experimental Study of Disorganisation of Speech and Manual Responses in Normal Subjects. <i>Hill, H. E.</i>	295
Store Clerk's Reaction to Stuttering. <i>McDonald, E. T., and Frick, J. V.</i>	306
The Merits of Backward Playing of Connected Speech in the Scaling of Voice Quality Disorders. <i>Sherman, D.</i>	312
Voice Problems of the Actor and Singer. <i>Brodnitz, F. S.</i>	322
An Experimental Study of the Possible Relation Between Errors of Speech and Spelling. <i>Carrell, J., and Pendergast, K.</i>	327
The Relationship of Auditory Discrimination to Articulatory Defects of Children with No Known Organic Impairment. <i>Kronvall, E. L., and Diehl, C. F.</i>	335
Environmental Influences on the Verbal Output of Mentally Retarded Children. <i>Schlanger, B. B.</i>	339
An Empirical Investigation of the Loss of Spelling Ability in Dysphasics. <i>Thurston, J. R.</i>	344
The Conditioned Galvanic Skin Response under Two Modes of Reinforcement. <i>Meritzer, C. L., and Doerfer, L. G.</i>	350
A Speech Reception Threshold Test for Children. <i>Siegenthaler, B. M., et al.</i>	360

DECEMBER

The Information of Sounds and Phonetic Diagrams of One- and Two-Syllable Words. <i>Black, J. W.</i>	397
An Experimental Investigation of Dichotic Word Presentation. <i>Ptacek, P. H.</i>	412
Pitch Level and Nasality. <i>Sherman, D., and Goodwin, F.</i>	423
Contributions of the Visual Components of Oval Symbols to Speech Comprehension. <i>O'Neill, J. J.</i>	429

The Adaptation Effect in Stuttering and Its Relation to Thoracic and Abdominal Breathing. <i>Starbuck, H. S., and Steer, M. D.</i>	440
A Study of Adaptation and Recovery of the Stuttering Response in Self-Formulated Speech. <i>Newman, P. W.</i>	450
A Study of the Diagnosis of Stuttering with Special Reference to the Sex Ratio. <i>Bloodstein, O., and Smith, S. M.</i>	459
A First Step in the Evaluation of Stuttering Therapy. <i>Schaefer, R., and Matthews, J.</i>	467
An Integration of Psychotherapy and Speech Therapy Through a Conflict Theory of Stuttering. <i>Sheehan, J. G.</i>	474
The Effect of Changes in Side-Tone Delay and Level upon Rate of Oral Reading of Normal Speakers. <i>Peters, R. W.</i>	483
Relationships Between Certain Aspects of Personality and Some Vocal Effects of Delayed Speech Feedback. <i>Spilka, B.</i>	491
Modern Linguistics and Recovery from Aphasia. <i>Surgill, M. H.</i>	507
Language Disorders and Parent-Child Relationships. <i>McCarthy, D.</i>	514
Some Factors in the Intelligibility of Cleft-Palate Speech. <i>McWilliams, B. J.</i>	524

VOL. 4

NEUROL.

AUGUST, 1954

The Changing Front of Research on Poliomyelitis. <i>Kumm, H. W.</i>	565
*Intolerance of the Primate Brainstem and Hypothalamus to Conventional and High Energy Radiations. <i>Arnold, A., et al.</i>	575
*Investigation of the Primate Amygdala Movements of the Face and Jaws. <i>Baldwin, M., et al.</i>	586
Clinical Differential Diagnosis of the Motor Seizure. <i>Gregg, H. C., and Rose, A. L.</i>	599
*Stimulation of "Second" Motor Areas in the Macaque Temporal Lobe. <i>Schneider, R. C., et al.</i>	612
Effects of Intrathecal Mephenesin in Paraplegia. <i>Berlin, L.</i>	623
Afferent Projection of the Superior Laryngeal Nerve in the Brainstem. <i>Lam, R. L., and Ogura, J. H.</i>	630

Intolerance of the Primate Brainstem and Hypothalamus to Conventional and High Energy Radiations

1. From experimental and clinical studies, the brainstem and hypothalamus of man and monkey appear to be intolerant to large doses of X-rays from conventional X-ray equipment and to biologically equivalent doses of radiations (X-rays and electrons) from the betatron.

2. The intolerance of the primate brainstem and hypothalamus to large doses of radiation is due to two factors: (1) these areas subserve many functions essential for survival, and (2) these areas are much more radio-responsive than cortical areas.

3. The primate brainstem and hypothalamus will also respond to moderate dosages of radiations.

4. The significance of these observations was then considered with respect to: (1) the brainstem in brain tumor therapy, (2) the possible potential damage to the brainstem in atomic radiations, when restricted to the head, and (3) the effects of X-irradiation of the pituitary-hypothalamic region on clinical disorders related to pituitary dysfunction.

(Authors' Abstr.)

Investigation of the Primate Amygdala

From these preliminary observations the authors' conclude that movements of face and jaw follow electrical stimulation of the mesial amygdala in the *Macaca mulatta*. The movements which they have observed follow a particular pattern. This begins with eversion of the upper lip on the same side as the stimulus. The movements of face become bilateral following repetitive stimulation of the amygdala on one side. Then an after-discharge may be recorded in the region of the opposite amygdala. This suggests a functional connection between the amygdaloid nuclei, and it may be that they have interrupted the structural basis of this connection by cutting the anterior commissure in one animal. These relationships await further study.

The movements of face and jaw which follow electrical stimulation of the inferior mesial temporal region in patients seem analogous to those they have described as the results of stimulation in the amygdala of *Macaca mulatta*.

On the basis of this physiologic evidence they suggest that epileptiform discharge in one amygdaloid nucleus may spread rapidly across the midline to the other amygdaloid nucleus. Thus clinical and electrographic evidence of this discharge may appear on either side soon after its origin deep within one temporal lobe. Such discharge need not originate in the amygdaloid nucleus itself. It may arise in the temporal cortex and spread to the amygdala beneath. Pribram, Lennox, and Dunsmore have demonstrated that epileptiform discharge arising in the temporal cortex may affect the ipsilateral amygdaloid nucleus.

(Authors' Abstr.)

Stimulation of "Second" Motor Areas in the Macaque Temporal Lobe

There is a "second" or "additional" motor area in the temporal lobe of the monkey which, upon stimulation, will evoke ipsilateral facial movements. This area is located at the tip of the temporal lobe, in the superior and middle temporal gyri, and particularly in the lateral and basal portions of the inferior temporal gyrus.

These face movements are combined frequently with shoulder and arm movements when the middle and inferior temporal gyri are stimulated and particularly with leg movements when the inferior temporal gyrus is the site of stimulation. Farther back in the temporal lobe there is some indication that arm and leg movements may be obtained independently of motor responses of the face.

(Authors' Abstr.)

SEPTEMBER

Complications of Cerebral Angiography. Kaplan, A. D., and Walker, E. A.	643
*Effects of Serpasil on Behavior and Autonomic Regulating Mechanisms. Schneider, J. A., and Earl, E. A.	657
The Status of Neurology as a Specialty in Various Countries. Kalinowsky, L. B., and Merritt, H. H.	668
*Studies on Experimental Concussion. Gurdjian, E. S., et al.	674
*Treatment of Parkinsonism with Pagitane Hydrochloride. Zier, A., and Doshay, L. J.	682
Recent Methods of Management of Spinal Cord and Cauda Equina Injuries. Boshes, B., et al.	690

Effects of Serpasil on Behavior and Autonomic Regulating Mechanisms

1. Reserpine (Serpasil) was given to a group of *Macaca mulatta* monkeys in varying doses and by different routes of administration. The effect on behavior, electroencephalograms, body temperature, systolic blood pressure, heart rate, respiratory rate, and pupillary diameter were studied.

2. Single intravenous doses of 0.5 to 1 mg./kg. and single oral doses of 50 mg./kg. produce a state of quietude and unresponsiveness to extraneous stimuli, characterized by an essentially normal electroencephalogram, which clearly distinguishes it from sleep induced by barbiturates.

3. Parallel to the changes in behavior a drop in body temperature, an equivocal drop of blood pressure and a reduction of heart rate and respiratory rate were observed, whereas miosis and diarrhea, commonly seen in other species after Serpasil, were not present.

4. The threshold dose for chronic daily oral administration in the monkeys was 2 to 3 mg./kg.

5. Increasing the dose by all routes of administration did not enhance the effects observed but tended to prolong them. Toxic manifestations were not encountered after Serpasil in doses up to 4 mg./kg. intravenously and 400 mg./kg. orally.

6. The results of this study are in agreement with the experimental findings in other species and in man and further support the theory that the main point of attack of this drug is probably in the brainstem.

(Authors' Abstr.)

Studies on Experimental Concussion: Relation of Physiologic Effect to Time Duration of Intracranial Pressure Increase at Impact

1. An experimental study of head injury has been carried out, in which the time duration of the increased intracranial pressure at the time of impact is controlled.

2. The experiments show that the shorter the time duration the higher the pressure necessary to result in a concussive effect. The longer the time duration the lower can the pressure be in order to effect a concussion.

3. Concussion resulting from acceleration, deceleration, or compression is caused by an increase in intracranial pressure at the time of impact. With compression an increase in intracranial pressure is more uniform throughout. Acceleration or deceleration injuries result in increased intracranial pressure with pressure gradients in the cranial cavity.

(Authors' Abstr.)

Treatment of Parkinsonism with Pagitane Hydrochloride

A new synthetic drug, Pagitane hydrochloride, has already been reported in the literature. The present report is a clinical survey of its action in a series of 142 patients with parkinsonism who had done poorly on other remedies. Of this number, 94 (66 per cent.) manifested improvement of varying degree, 40 (28 per cent.) were unimproved, and eight (6 per cent.) appeared to be worse. The study covered a period of 15 months. Methods of administration and procedure are described.

Pagitane hydrochloride was found to be considerably more potent than Artane and less disturbing in its side reactions, especially dryness of the mouth and mental clouding. It is possible that within several years, as in the case of Artane, its effects may wear off in a larger percentage of patients than is evident now, or patients may tire of it and turn to some new preparation. Nevertheless, the fact that so many of them have chosen to remain on Pagitane for long periods of time and have continued to derive benefits from it establishes the drug as a valuable addition to the armamentarium for the treatment of parkinsonism.

Pagitane can be administered to all types of cases. Other than the usual side reactions of belladonna products and their congeners, it showed no toxic effects among any of the patients in this study. It is safe for both young and old patients, and may be employed as the drug of choice in starting treatment with new cases. It exerts a favorable action against rigidity,

oculogyria, and mild forms of tremor. It is a powerful cerebral stimulant and serves to counteract akinesia, sluggishness, tiredness, and weakness. It readily combines with other drugs for more effective action against advanced stages of rigidity and tremor, such as hyoscine, Benadryl, atropine, MK-02 and so on. It is especially beneficial as a substitute for Artane among patients in whom the latter drug no longer controls symptoms.

(Authors' Abstr.)

OCTOBER

Puerperal Hemiplegia. <i>Stevens, H.</i>	723
Role of Hypothalamic Mechanisms in Thalamic Pain. <i>Spiegel, E. A., et al.</i>	739
Clinical Evaluation of Focal Depression of Voltage in Electroencephalography. <i>Friedlander, W. J.</i>	752
Mestinon in the Treatment of Myasthenia Gravis. <i>Westerberg, M. R., and Magee, K. R.</i>	762
*Migraine and Tension Headaches. <i>Friedman, A. P., et al.</i>	773
Failure of Muscular Dystrophy Treatment with a Protein Hydrolysate. <i>Drew, A. L., et al.</i>	789

Migraine and Tension Headaches

Two thousand patients suffering from migraine and tension headache were studied during the past seven years. Migraine represents a definite clinical entity and may be defined as that form of headache which is characteristically paroxysmal, periodic, unilateral, and throbbing. It is preceded by an aura and is usually associated with vomiting. There is frequently a positive family history. It is our impression that the treatment of migraine is a complex, individualized procedure. Symptomatic treatment is essentially one of pharmacotherapy, and the best results have been obtained with the use of ergotamine derivatives, notably a compound of ergotamine and caffeine (Cafergot). Prevention of an attack is best accomplished by psychotherapy.

Tension headache is that type of headache occurring in relation to constant or periodic emotional conflicts. Tension headaches are usually bilateral and may be accompanied by a variety of associated signs, including anxiety, nausea, and vomiting. Frequency and duration are variable. The best symptomatic relief is obtained with analgesics and sedatives. The best prophylactic results are obtained by psychotherapy.

(Authors' Abstr.)

NOVEMBER

Experiences Involving the Superior Longitudinal Sinus and Rolandic Veins. <i>Swanson, H. S., and Fincher, E. F.</i>	801
Paper Electrophoretic Studies in Multiple Sclerosis. <i>Roboz, E., et al.</i>	811
Pulseless Disease. <i>Currier, R. D., et al.</i>	818
Optic Function and Postural Attitude. <i>Halpern, L.</i>	831
The Fate of Clinically Unrecognised Intracranial Meningiomas. <i>Moore, M. T.</i>	837
Cheiralgia Paresthetica. <i>Sprockin, B. E.</i>	857
Diamox. <i>Merlis, S.</i>	863

DECEMBER

Spinal Cord Dysfunction from Cervical Intervertebral Disk Disease. <i>Stern, W. E., and Rand, R. W.</i>	883
Toward a Neurology of Behavior. <i>Mackay, R. P.</i>	894
Significance of Negative Neurosurgical Diagnostic Studies. <i>Martin, F. A., et al.</i>	902
Postconcussion Syndrome in Compensation and Litigation. Analysis of 95 Cases with EEG Correlations. <i>Denker, P. G., and Perry, G. F.</i>	912
Return of Motor Function in Hemiplegia. <i>Van Buskirk, C.</i>	919
Radioactive Phosphorus in Management of Brain Tumors. <i>Garrity, R. W., and Matthews, L. W.</i>	929
*Use of Milontin in the Control of Petit Mal Epilepsy. <i>Carter, C. H.</i>	935

Use of Milontin in the Control of Petit Mal Epilepsy

1. Milontin has been demonstrated to be an effective drug for the control of petit mal epilepsy.

2. In certain instances of mixed epilepsy, the number of grand mal attacks may be increased with a concomitant decrease in petit mal attacks.

3. No significant changes in the blood or urine were observed following a ten month period of therapy.

4. Because of freedom from toxicity and effectiveness, Milontin is worthy of trial in the treatment of petit mal, either of pure or mixed type.

5. In a very small group of psychomotor epileptics the response to this drug was very good.

(Author's Abstr.)

VOL. 5

JANUARY

Combined Trigeminal and Glossopharyngeal Neuralgia. <i>Brzustowicz, R. J.</i>	1
Observations on the Motor System Following Cerebral Hemispherectomy. <i>French, L. A., and Johnson, D. R.</i>	11
Hereditary Sensory Neuropathy. <i>Heller, I. H., and Robb, P.</i>	15
Diagnostic Localizing Value of Muscle Atrophy in Parietal Lobe Lesions. <i>Silverstein, A.</i>	30
Effect of Reserpine upon the Human EEG. <i>Dennison, A. D., et al.</i>	56

VOL. 17

PSYCHIAT.

AUGUST, 1954

The Self-righteous Moralist in Early Meetings of Therapeutic Groups. <i>Rosenthal, D., et al.</i>	215
Selective Inattention as an Explanatory Concept for U.S. Public Attitudes Toward the Atomic Bomb. <i>Perry, H. S.</i>	225
The Homosexual Conflict. <i>Ovesey, L.</i>	243
Heroin Addiction Among Young Men. <i>Fort, J. P., jun.</i>	251
Asian Nationalism. <i>Linebarger, P. M. A.</i>	261
Theoretical and Clinical Aspects of Short-term Parent-Child Psychotherapy. <i>Phillips, E. L., and Johnston, M. S. H.</i>	267
Role-divided Three-cornered Therapy. <i>Bock, J. C., et al.</i>	277
Considerations and Problems of Ward Care for Schizophrenic Patients. <i>Kraus, P. S.</i>	283

NOVEMBER

The Development of Focal Attention and the Emergence of Reality. <i>Schachtel, E. G.</i>	309
An Examination of the Concept of Psychodynamics. <i>Money, J.</i>	375
Exploring the Therapeutic Use of Counter Transference Data. <i>Tauber, E. S.</i>	331
A Procedure for the Systematic Analysis of Psychotherapeutic Interviews. <i>Eldred, S. H., et al.</i>	337
The Rehabilitation of Chronic Open-ward Neuropsychiatric Patients. <i>Miller, D. H.</i>	347
Impersonal Disturbances in the Family. <i>Ackerman, N. W.</i>	359
The Social Roles of Doctor and Patient in Psychoanalysis and Psychotherapy. <i>Spiegel, J. P.</i>	369
Mental Illness in Primitive Societies. <i>Benedict, P. K., and Jacks, I.</i>	377

VOL. 28

PSYCHIAT. QUART.

APRIL, 1954

The Prognostic Value of "Mobility" During the First Two Years of Hospitalization for Mental Disorder. <i>Crandell, A., et al.</i>	185
The Psychologic Implications of Overeating. <i>Conrad, S. W.</i>	211
Suicide. <i>Weiss, J. M. A.</i>	225
Instinct of Self-Preservation and Neurosis. <i>Fischer, S.</i>	253
Hostility and Psychotic Symptoms. <i>Cohen, F.</i>	264
Psychoanalytic or Didactic Group Psychotherapy? <i>Klapman, J. W.</i>	279
The Process-Organization of Psychotherapy. <i>Buhler, C.</i>	287

JULY

Adolescent Opiate Addiction. <i>Gerard, D. L., and Kornetsky, C.</i>	367
The Use of Methridine in Psychiatric Practice. <i>Brussel, J. A., et al.</i>	381
A New Aid to Insulin Coma Therapy. <i>Greenbank, R. K.</i>	395
A Statistical Study of Patients in the New York Civil State Hospitals. <i>Malzberg, B.</i>	398
Revival of Early Memories with the Appearance of Primitive Defense Reactions, etc. <i>Robertello, R. C.</i>	410
The Control of Tuberculosis Among Patients in Mental Institutions. <i>Katz, J., et al.</i>	416
ECT Following Prefrontal Lobotomy. <i>Kris, E. B.</i>	424
A Study of the Changing Role of the Psychiatrist in the State Hospital. <i>Lichtenberg, J. D.</i>	428
Emotional Problems of the Middle-aged Man. <i>Billig, O., and Adams, R.</i>	442
An Investigation of Certain Psychodiagnostic Indications of Suicidal Tendencies and Depression in Mental Hospital Patients. <i>Broida, D. C.</i>	453
Psychotherapy in a Mental Hygiene Clinic. <i>Tissenbaum, M. J.</i>	465
Evil Eye in Myth and Schizophrenia. <i>Tourney, G., and Plazak, D. J.</i>	478

VOL. 23

PSYCHOANAL. QUART.

1954

Sleep, Narcissistic Neurosis and the Analytic Situation. <i>Lewin, B. D.</i>	487
Observations on Blank Dreams with Orgasms. <i>Kauzer, M.</i>	511
Acting Out and Ego Development. <i>Carroll, E. J.</i>	521
Ego and Superego in Obsessional Character and Neurosis. <i>Weissman, P.</i>	529
Psychosis in Children. <i>Starr, P. H.</i>	544
Some Factors Influencing the Oedipus Complex. <i>Jackson, D. D.</i>	566

VOL. 24

1955

Fantasies of Menstruation in Men. <i>Faergeman, P. M.</i>	1
The Mutual Adventures of Jonathan Swift and Lemuel Gulliver. <i>Greenacre, P.</i>	20
Notes on Oral Symbolism. <i>Arlow, J. A.</i>	63
A Unitary Hypothesis of Emotion. <i>Blau, A.</i>	75
The Favorite Joke in Diagnostic and Therapeutic Interviewing. <i>Zwerling, I.</i>	104

VOL. 16

PSYCHOSOM. MED.

1954

Selection of Clinical Material in Psychosomatic Medicine. <i>Engel, G. L.</i>	368
Psychodynamic and Arteriographic Studies of Acute Cerebral Vascular Disorders. <i>Seidenberg, R., and Ecker, A.</i>	374
Capillary Response to Emotion. <i>Kramár, J., et al.</i>	393
Blood Viscosity of Psychotics and Non-psychotics under Stress. <i>Levine, J., et al.</i>	398
The Direction of Anger During a Laboratory Stress-inducing Situation. <i>Funkenstein, D. H., et al.</i>	404
Chronic Brucellosis and Psychoneurosis. <i>Harris, H. J., and Kemple, C.</i>	414

VOL. 6

Q. J. EXPER. PSYCHOL.

AUGUST, 1954

The Impact of Visual Aid Displays Showing a Manipulative Task. <i>Laner, S.</i>	95
An Illusion of Movement Complementary to the Horizontal-Vertical Illusion. <i>Reid, R. L.</i>	107
A Further Study of the Pendulum Phenomenon. <i>Hall, K. R. L., and Earle, A. E.</i>	112
Apparent Transparency and the Tunnel Effect. <i>Glynn, A. J.</i>	125

NOVEMBER

The Nature of Set-to-Learn and of Intra-Material Interference in Immediate Memory. <i>Brown, J.</i>	141
Tactile-Kinaesthetic Perception of Straightness in Blind and Sighted Humans. <i>Hunter, I. M. L.</i>	149
The Effects of Position in a Display upon Problem Solving. <i>Kay, H.</i>	155
Selective Effects of an Anaesthetic Drug on Cognitive Behaviour. <i>Steinberg, H.</i>	170
Drive-Level and Flexibility in Paired-Associate Nonsense-Syllable Learning. <i>Gordon, W. M., and Berlyne, D. E.</i>	181

VOL. 15

QUART. J. STUD. ALC.

SEPTEMBER, 1954

Influence of Disulfiram on Blood Pressure Response to Sympathomimetic Agents, Histamine and Acetylcholine. <i>Feingold, A.</i>	373
Abnormalities in Urine Concentration Function in Alcoholics. <i>Schultz, E. H., jun., and Cowen, J.</i>	379
A Study of the Rationale of the Treatment of Delirium Tremens with ACTH. I. <i>Owen, M.</i>	384
*A Study of the Rationale of the Treatment of Delirium Tremens with ACTH. II. <i>Owen, M.</i>	387
Alcoholism in the Case Load of the New York City Welfare Department. <i>Hirschberg, B.</i>	402
A Six-year Follow-up of a Series of Committed Alcoholics. <i>Cowen, J.</i>	413
First Aid for Alcoholics. <i>Querido, A.</i>	424
Considerations of Content Material of Group Counseling Sessions with Jailed Alcoholics. <i>Lerner, A.</i>	432
Problem Drinking and Industry. <i>Franco, S. C.</i>	453
Alcoholism as a Public Health Problem. <i>Querido, A.</i>	469
Prohibition in Finland, 1919-32. <i>Sariola, S.</i>	477
Notes on Drinking in Japan. <i>Yamamuro, B.</i>	491

A Study of the Rationale of the Treatment of Delirium Tremens with Adrenocorticotrophic Hormone

Data were collected on the course of delirium tremens in 27 patients whose adrenal cortex reserve status was determined by means of the eosinophil response to a test injection of adrenocorticotrophic hormone. Adrenal cortex insufficiency was found to be related to prolonged alcoholism rather than to any of the phenomena of delirium tremens.

The high incidence of adrenal cortex insufficiency in delirium tremens may be secondary to a postulated pituitary-hypothalamic disorder which, if it existed, could account for many of the phenomena of death in delirium tremens.

Possible ways of unravelling the psychological and biological factors in alcoholism and delirium tremens are suggested.

(Author's Abstr.)

- Organization and Function of a Clinic for the Alcoholic Patient with Liver Disease. *Leevy, C. M., et al.* 537
- Relationship of Personality Adjustment to Eating and Drinking Patterns in a Group of Italian Americans. *Lisansky, E. S., et al.* 545
- The Adjustment of the Family to the Crisis of Alcoholism. *Jackson, J. K.* 562
- Factors Linked to Success in Counseling Homeless Alcoholics. *Wattenberg, W. W., and Moir, J. B.* 587
- Psychoanalytic Therapy and Alcoholism. *Shea, J. E.* 595
- The Treatment of Alcoholism with Disulfiram in a Military Setting. *De Generes, L. H.* 606
- The Ego Factors in Surrender in Alcoholism. *Tiebout, H. M.* 610
- A Study of the Relation of Ethnic Background to Arrests for Inebriety. *Skolnick, J. H.* 622

1. Biochemistry, Physiology, Pathology, etc.

Decreased Protein in Cerebrospinal Fluid. *Hohmann, Hans.* [Nervenarzt., 25, 55 (1954).]

The protein concentration of cerebrospinal fluid was abnormally low in 3 per cent. of 2,068 patients. Nearly 50 per cent. of the low values were in epileptics, the rest being distributed among 16 diseases of the central nervous system.

WARREN M. SPERRY (Chem. Abstr.)

Primary Tumors of the Brain and Meninges in Rats Fed 2-acetylaminofluorine. *Hoch-Ligeti, C., and Russell, D. S.* [Acta Unio Intern. contra Cancrum, 7, 126 (1950).]

Two cerebral gliomas and a meningioma resulted from feeding 0.07 per cent. 2-acetylaminofluorine in the diet of 50 rats. Liver tumors were common.

RICHARD F. RILEY (Chem. Abstr.)

The Relation of Urinary Copper Excretion to the Amino-aciduria in Wilson's Disease (Hepatolenticular Degeneration). *Uzman, L. Lahut.* [Am. J. Med. Sci., 226, 645 (1953).]

In a 14 year old boy with hepatolenticular degeneration with persistent massive amino-aciduria and increased Cu excretion, the urinary Cu was isolated in the form of a complex with oligopeptides. The daily Cu output was unrelated to the amino-aciduria. The oligopeptides-Cu chelate complex may represent the form in which Cu passes from plasma into the glomerular filtrate, and the urinary excretion of Cu may result from the competition for tubular resorption, between the oligopeptide complex and the amino acids present in high concentration in the tubular fluid.

MARION HORN PESKIN (Chem. Abstr.)

The Changes in the Proteins of the Blood and Spinal Fluid in Syphilis of the Central Nervous System. *Kutzim, H., et al.* [Die Medizinische, 609, (1954).]

Spinal fluid was concentrated by ultrafiltration and its paper electrophoresis diagram compared with that of the blood serum of the same patient. Normal spinal fluid had a composition of: peralbumin (I) 4-5, albumin (II) 52, α_1 -globulin 4.5, α_2 -globulin 8, β -globulin 16, γ -fraction (III) 6, and γ -globulin (IV) 8.9 per cent. (I) was found in the spinal fluid of all cases of syphilis and (III) in some cases. The (II) of the spinal fluid was low (20.2-39.5 per cent.) and the (IV) high (31.8-55.7 per cent.) in the syphilitic cases, but they did not reflect the composition of the blood serum. The changes in the spinal fluid paralleled the clinical picture.

A. DIETZ (Chem. Abstr.)

Metabolism of Acetylcholine. 1. *Nakata, Fujio.* [Nisshin Igaku, 39, 493 (1952).]

With the method of Feldberg the production of acetylcholine by acetone-powder preparations of various organs of rat was examined with the help of adenosinetriphosphate. One g. of powder of brain, heart, intestine, and gluteal muscle synthesized 147, 64, 47, and 30 γ of acetylcholine, respectively in three hours.

TETSURA KONO (Chem. Abstr.)

Lipides in the Chemical Structure of the Nerve System. *Klenk, E.* [Naturwissenschaften, 40, 449 (1953).]

A review with references.

B. J. C. VAN DER HOEVEN (Chem. Abstr.)

Xenon Concentration Changes in Brain and Other Body Tissues of the Dog During Inhalation of the Gas. *Pittinger, C. B., et al.* [J. Pharmacol. Exptl. Therap., 110, 458 (1954).]

The rates of absorption of Xe by various tissues during inhalation of an 80:20 Xe:O₂ mixture were determined. Most parts of the brain were saturated within about 6 minutes, but the cerebral parietal cortex was not always saturated even after 20 minutes of inhalation. The Xe concentration in the adrenals rises rapidly and exceeds that of the brain after 10 minutes of inhalation. Kidney, liver, and striated muscle absorb Xe slowly.

L. E. GILSON (Chem. Abstr.)

Disturbances in Acid Metabolism and Blood Alcohol Test After Brain Traumas. Seifert, P., et al. [*Deut. med. Wochschr.*, **79**, 193 (1954).]

In 90 per cent. of the cases the reserve alkali showed an increase and in 10 per cent. a decrease which disappeared within 3 days. During diminution of the alkali reserve the blood alcoholic values were normal. In experimental acidosis in the rabbit and man the blood alcohol showed no increase.

ERICH HEFTMANN (Chem. Abstr.)

The Precursors of Sphingosine in Brain Tissue. Sprinson, David B., and Coulon, Andrée. [*J. Biol. Chem.*, **207**, 585 (1954).]

The synthesis of sphingosine in nervous tissue was investigated with the aid of glycine-1-C¹⁴, glycine-2-C¹⁴, N¹⁵, ethanolamine-2-C¹⁴, and L-serine 3-C¹⁴, 2,3-D, N¹⁵. C atoms 3 and 2 and the N of serine are utilized for C atoms 1 and 2 and the N of sphingosine, respectively, while the carboxyl group is lost. Ethanolamine is not used for this portion of the molecule, while the α -C and N of glycine are incorporated, probably by way of serine. The incorporation of label into C atoms 3-18 of sphingosine was compared with that of the fatty acid and D-galactose moieties of cerebrosides, and with brain cholesterol. Ethanolamine is effectively utilized for C-3 to C-18 of sphingosine, and fatty acids and cholesterol via conversion to acetate. The galactose had only low activity, although several of the compounds administered are effective glycogen formers in liver.

FELIX SAUNDERS (Chem. Abstr.)

Concentration of Sympathin in Different Parts of the Central Nervous System Under Normal Conditions and After the Administration of Drugs. Vogt, Marthe. [*J. Physiol.*, **123**, 451 (1954).]

A method is described which permits the estimation of adrenaline and noradrenaline (I) in small pieces of brain tissue. Highest concentrations of sympathin (II), an admixture of (I) and adrenaline, are in the regions containing the diencephalic, mesencephalic, and bulbar representations of sympathetic functions in dog and cat brains. Hypothalamic (I) in the cat brain was significantly lowered by apomorphine-HCl, ether, insulin, nicotine bitartrate, morphine-HCl, morphine-HCl with choline p-tolyl ether bromide, tetrahydro-2-naphthylamine carbonate, and picrotoxin; such a fall was correlated with the property of stimulation of sympathetic centers controlling adrenomedullary secretion. Asphyxia sufficiently severe to enhance medullary secretion also markedly lowered hypothalamic (I). However, adrenal denervation preventing medullary secretion did not interfere with the depleting action of drugs on (II) in the hypothalamus. Ether reduced the concentration of (I) in hypothalamus and midbrain. The amount of cat hypothalamic (II) was not affected by superior cervical ganglionectomy. The role of (II) in the central nervous system is discussed in terms of a transmitter function directly or through alteration of the transmission by other substances like acetylcholine.

MORRIS ROCKSTEIN (Chem. Abstr.)

Ascorbic Acid in the Brain Under Different Functional States of the Central Nervous System. Serdyuk, E. E. [*Ukrain. Biokhim. Zhur.*, **25**, 271 (1953).]

The ascorbic acid (I) content of the large hemispheres of the brain increased under all conditions of excitation: subcutaneous injection of camphor, interrupted electric shocks, bright lights. Animals with conditioned reflexes had, generally, a higher concentration of (I), which increased further on excitation. (I) Dropped in narcosis.

B. G. (Chem. Abstr.)

Estimation of Sphingomyelin in Nervous Tissue. Dawson, R. M. [*Biochem. J.*, **56**, 621 (1954).]

The fact that the molar choline/P ratio of alkali stable fraction of brain lipides is less than 1 suggests that other phospholipides besides sphingomyelins are involved. The estimation of sphingomyelin P in nervous tissue by alkaline hydrolysis gives only an approximate result. Preliminary treatment of tissue lipides with CCl₃CO₂H increases the accuracy somewhat because part of the interfering nonsphingomyelin lipide P is thus removed (without affecting the recovery of sphingomyelin). However, for more precise determination the estimation of the choline in the alkali-stable fraction is advised.

S. MORGULIS (Chem. Abstr.)

Parkinson's Disease. Durel, P. [*J. med. Lyon*, **30**, 431 (1949).]

In 250 cases of parkinsonism, Diparcol was effective (moderate to very good action) in all but 6.1 per cent. of the cases (which showed side effects which are discussed). The action is greatest on the hypertony and bradykinesia, and least on the tremor. Salivation is not affected. The action is discussed in relation to the effects of parpanit, phenergan, and benadryl.

A. C. TOBIE (Chem. Abstr.)

The Inhibition of Cholinesterases by Antagonists of Acetylcholine and Histamine. Todrick, A. [Brit. J. Pharmacol., 9, 76 (1954).]

The ratio for 50 per cent. inhibition (I_{50}) of brain cholinesterase/ I_{50} for cholinesterase of intestinal mucosa had a value less than 0.2 for most neuromuscular blocking agents. For antimuscarinic agents the ratio was between 5 and 60; while for drugs effective in parkinsonism the ratio was greater than 40. Several exceptions to the above were found.

RICHARD F. RILEY (Chem. Abstr.)

Formation of Ammonium Ion in the Cerebrum in Fluoroacetate Poisoning. Benitez, D., et al. [Am. J. Physiol., 176, 488 (1954).]

The concentration of NH_4 ion in cerebral tissue of dogs was increased nearly 7-fold during the course of fluoroacetate poisoning. It reached a maximum at about 60 minutes, and epileptiform seizures supervened at approximately the same time. The cerebral origin of the NH_4 ion was indicated by the relatively low levels in the blood. The precursor of the NH_4 ion is unknown. The cerebral NH_4 ion concentration was increased during seizures induced by pentamethylenetetrazole, but the levels attained were lower than those reached in fluoroacetate-poisoned animals during the preconvulsive stage. Infusion of NH_4Cl induced cortical seizures in 2 animals and cortical depression without seizures in 3 animals. Subdural injection of NH_4 salts did not induce excitation of the cortex.

E. D. W. (Chem. Abstr.)

The Effect of the Monohydroxybenzoic Acids on the Respiration of Rat Brain Homogenates. Patel, Chandulal A., and Heim, Harold C. [J. Am. Pharm. Assoc., 43, 251 (1954).]

The respiration of rat-brain homogenate was inhibited by salicylate but not by m- or p-hydroxybenzoate when succinate was the substrate, was inhibited by all 3 when lactate was the substrate, was stimulated by salicylate but not by the other 2 when pyruvate or glucose was the substrate, and was stimulated by all 3 when glutamate was the substrate.

DAVID B. SABINE (Chem. Abstr.)

The Chemical Diagnosis of Alcoholic Intoxication. Prag, J. J. [S. African J. Med. Sci., 18, 141 (1953).]

Investigations have been made of the normal blood alcoholic concentration in abstainers, moderate and heavy drinkers, all with the same dose of alcohol. The rates of combustion, absorption, and elimination in normal individuals with different doses of alcohol are also analyzed. Investigations of 100 cases of drunk drivers indicate that the ratio of blood alcohol to urine alcohol is 1.00:1.31, that motor abnormality is the most important sign in diagnosing intoxication, that the smell of alcohol on the breath is of least importance, that dilation of the pupils is an inconsistent sign, that the degree of intoxication is parallel to the motor and psychological abnormality, and that over 0.15 per cent alcohol in the blood is a strong indication of intoxication and below 0.05 per cent. the person is sober. A comparison of the clinical state of intoxication with the maximum blood alcohol concentration proves that the maximum drunkenness is present long before the blood alcohol reaches its maximum. Sugars increase the degree of intoxication, but assist in sobering the individual more quickly as they increase the rates of combustion and elimination of alcohol. 17 references.

W. R. HENN (Chem. Abstr.)

The Influence of Excitation of the Central Nervous System on the Metabolism of Substances in the Muscles. Epshtein, S. F. [Ukrain. Biokhim. Zhur., 25, 247 (1953).]

A single injection of pervitin (or cardiazole) reduced the acid-soluble P compounds fraction in the skeletal muscles; acid-insoluble fraction was increased, and the same was true on repeated injections. The general intensity of P metabolism was increased; NH_3 and glutamine were not changed in the muscle but were increased in the blood. Acid-soluble fraction in the heart muscles was reduced considerably with an appreciable increase of the acid-insoluble fraction. The results would indicate that the stimulation of the central nervous system with pervitin or cardiazole does not cause any apparent work for the muscles but results in some changes in the processes of metabolism. It could be expected that the excitation might reflect to a greater degree on the chemical processes of the muscles in action.

B. GUTOFF (Chem. Abstr.)

Organic Aspects of Periodic Catatonia. V. Type B. Gjessing, R. [Arch. Psychiat. Nervenkrankh., 191, 191 (1953).]

In 2 patients with periodic catatonia of the synchronous-syntonic (SS.) type the acute onset of the reaction phase occurred about midway between maximum and minimum N retention, in contrast to previously described patients in whom the change occurred at the maximum (Type A) or minimum (Type C). The response (stupor or excitement) in the reaction phase is related to the position on the N-retention curve where the onset occurs. Two normal young men were subjected for about 2 months to the same regime which G. has used in long-continued (frequently 1 year or more) studies of patients, including confinement in bed, a consistent liquid diet, and daily or frequent determining of a large number of chemical constituents of blood and excreta, particularly N-containing compounds. It required about 1 month for a metabolic steady state (consistent N balance, etc.) to be reached. There were no cyclic fluctuations in the excretion of N-containing compounds such as are characteristic of SS. periodic catatonias.

VI. Environmental Factors. Gjessing, R. [Ibid., 220.]

A high-fat diet of consistent compound (milk, eggs, cream, sugar, vitamins, NaCl, and trace elements) has been used G.'s studies since 1928. There was no correlation between physical activity and of the cyclic fluctuations in N balance.

VII. Evaluation of the Findings. 1. Gjessing, R. [Ibid., 247.]

The very large number of data obtained in G.'s study of periodic catatonias during many years leads to the following conclusions: O consumption is always higher in the reaction phase (stupor or excitement) than in the relatively normal intervals. Despite the use of a standardized diet and consistent protein intake the N excretion in the urine varies in phases which have the same length as those of the psychic periods, but the point on the N-balance curve at which the psychic change occurs varies in different patients. The difference between minimum and maximum total N retention varies from about 15 to 30 g. Urea accounts for most of the variation; the excretion of ammonia N, uric acid, creatinine, and amino acids is usually normal. The range of variation of the blood nonprotein N is much increased, and the average concentration is usually above normal. Acidosis occurs during the periods of excess N excretion and alkalosis during the periods when N is being retained. NaCl excretion is less during the reaction phases than during the intervals between them. In 2 periodic catatonics it required 6 to 8 weeks for the establishment of N balance after a change to a low-protein (I) diet, and after 6 to 8 months on this diet it required 5 months for the re-establishment of N balance on a high-protein diet. The decreased excretion of N on the (I) diet was accounted for almost entirely by urea: other N-containing compounds of urine were little affected. The cyclic changes in psychic state were not affected by the (I) diet and the correlated changes in N retention continued at the lower level.

VIII. Evaluation of the Findings. 2. Gjessing, R. [Ibid., 297.]

The cyclic changes in periodic catatonias are ascribed to variations in thyroid function. There is also evidence of abnormal liver function in the reaction phase: Increased excretion of urobilin and other urinary pigments and increased concentration of bile pigment in serum.

W. M. SPERRY (Chem. Abstr.)

Vascular Diseases of the Brain. Adams, Raymond D., and Eecken, Henry M. Vander. [Ann. Rev. Med., 4, 213 (1953).]

A review. Some biochemical factors are covered. 186 references.

THERESA SEVERN (Chem. Abstr.)

2. Pharmacology and Treatment

Some Physical Mechanisms in Narcosis. Mullins, L. J. [Chem. Revs., 54, 289 (1954).]

Narcosis by chemically inert molecules appears to take place when a constant fraction of the total volume of some nonaqueous phase in the cell is occupied by narcotic molecules. If the narcotic behaves ideally in this nonaqueous phase, the thermodynamic activity of the narcotic multiplied by its molal volume is a constant, about 1 ml./mole. Higher values of thermodynamic activity for narcosis as one ascends a homologous series may be due to an increase in the activity coefficient of the narcotic in the nonaqueous phase, corresponding to an increased difficulty of inserting larger and larger molecules into this phase. The nonaqueous phase resembles a highly polar liquid. If the molecules of this phase are considered to be reasonably large, the liquid must be held together by H bonding. In peripheral nerve the nonaqueous phase has a highly polar structure, but in the central nervous system it has a considerably less polar structure and therefore one that can accommodate less polar molecules more easily. The possibility of creating lattice defects in the nonaqueous phase by inserting molecules equivalent in size and polarity to those of this phase but different in shape makes possible an explanation of the physiological action of convulsants. Narcosis and convulsant action operate independently, in that convulsants will overcome the effects of narcotics and vice versa. The experimental evidence available does not support any definitive mechanism for the action of narcotics. In the case of excitable structures it is unlikely that a proposal of enzymic inhibition can be supported by experimental data if an enzyme is to be regarded as a protein structure made up only of amino acids, since such an enzyme will have a structure totally unlike the phase to which narcotics can be shown to be partitioned. If the enzyme is modified by being encased in a lipid envelope, it is conceivable that access of enzyme to substrate could be impeded by a narcotic. 58 references.

LOUISE DELLEY (Chem. Abstr.)

Current Status of Vitamin Therapy in Nervous and Mental Disease. Peterman, Robert A., and Goodhart, Robert S. [J. Clin. Nutrition, 2, 11 (1954).]

The status of vitamin therapy in neurologic disorders is reviewed.

L. E. F. (Chem. Abstr.)

Clinical Evaluation of Primidone (Mysoline), New Anti-convulsant Drug. Sciarra, Daniel, et al. [J. Am. Med. Assoc., **154**, 827 (1954).]

A new compound, primidone (5-phenyl-5-ethylhexahydropyrimidine-4, 6-dione), was administered to 121 patients with one or more types of convulsive seizures. Its anticonvulsant effect could be evaluated in 72 patients who were observed for periods ranging from 1 to 18 months. In all but 7, primidone was given in conjunction with one or more of the standard anticonvulsant drugs. Seizures were completely controlled in 10 per cent., reduced in frequency in 43 per cent., and unchanged in 47 per cent. The greatest benefit occurred when the seizures were of the grand mal, psychomotor, minor, or focal types. No improvement was noted in any of the patients with petit mal. Side-effects occurred in 65 patients, but none were serious. Drowsiness and ataxia were the 2 most frequent symptoms and made it necessary to discontinue the administration of primidone in 25 patients.

EDWARD J. VAN LOON (Chem. Abstr.)

Effects of Reserpine, a New Alkaloid of Rauwolfia Serpentina on the Central Nervous System of the Animal. Meier, Rolf, et al. [Compt. rend., **238**, 961 (1954).]

Reserpine, given at doses ranging from 0.03 to 1.0 mg. per kg. orally or intravenously, produces hypotension of long duration and marked sedation. This sedative action, as measured by the postural reflexes, is not similar to that found with phenobarbital and NaBr. At more elevated dosage levels of reserpine, the sedation never reaches the narcosis stage, but the duration of the sedation is increased. Reserpine, in addition to a sedation, produces a miosis, a hypothermia, and central inhibition. Thus reserpine acts differently than other known sedatives.

N. R. STEPHENSON (Chem. Abstr.)

Mechanism of Action and Metabolism of Antiepileptics. Toman, J. E. P., and Taylor, J. D. [Arzneimittel-Forsch., **4**, 175 (1954).]

A review with 164 references.

K. SCHOEN (Chem. Abstr.)

Effect of Central Paralyzants in Animals Deprived of the Cerebral Cortex. Werner, G. [Naunyn-Schmiedeberg's Arch. exptl. Pathol. Pharmacol., **222**, 168 (1954).]

The effect of pentothal-Na and Largactil in cats is considerably enhanced after removal of the cerebral cortex. Bilateral superficial incisions at the base of the frontal lobes closely in front of the chiasma cause sham rage, but the sensitivity to the drugs is not increased.

A. E. MEYER (Chem. Abstr.)

Action of Some Medicinal Products to Increase the Permeability Towards the Brain Determined by the Action of Acetylcholine. Garattini, S., et al. [Atti soc. lombarda sci. med. biol., **8**, 399 (1953).]

Acetylcholine shock renders the blood-brain barrier permeable to electropositive dyes, such as Bismarck brown, toluidine blue, and methyl violet, but does not change the permeability of electro-negative dyes. Acetylcholine shock does not modify the fixation of procaine in the brain; it increases considerably the penetration of penicillin.

A. E. MEYER (Chem. Abstr.)

Synergy Between Procaine and Strychnine. Strychnine Increasing the Permeability of the Blood-brain Barrier. Garattini, S., et al. [Atti soc. lombarda sci. med. biol., **8**, 396 (1953).]

Both compounds act synergistically in producing convulsions. This is supposedly caused by intensive fixation of procaine in the cerebellum. Cerebellectomy increases the sensitivity of guinea pigs to strychnine. Strychnine increases the fixation of procaine in the brain.

A. E. MEYER (Chem. Abstr.)

Neurological Symptoms and Differential Diagnosis of Chronic Barbiturate Intoxication. Zigeuner, R., and Jaklitsch, H. [Med. Monatsschr., **8**, 81 (1954).]

The electroencephalic findings are analyzed. Therapy consists in intravenous injections of procaine which not only combat the symptoms but also prevent the appearance of the withdrawal syndrome.

A. E. MEYER (Chem. Abstr.)

In Vitro Action of Barbituric Acid, 2-thiobarbituric Acid, and Some of Their Derivatives on Glycolysis in the Tissue of the Central Nervous System and of the Liver in the Rabbit Fetus and Young Rabbit. Santarato, R. [Arch. sci. biol., **37**, 598 (1953).]

The action of barbiturates and thiobarbiturates on nervous and hepatic tissue of the fetuses of rabbits close to term and of newborn animals is fundamentally different than the effect on these tissues in adult rabbits. They inhibit the enzyme activity decisively. The cerebral tissue turns to adult response at about the 90th day of life, the liver tissue at the 40th day.

A. E. MEYER (Chem. Abstr.)

The Influence of Depression of the Central Nervous System (Narcosis) on the Contents of Adrenaline in the Adrenal Glands of White Mice. Kulins'kii, V. I. [Ukrain. Biokhim. Zhur., 25, 278 (1953).]

There were 3 stages in the change in the value of adrenaline content under ether narcosis: 1st, sharp drop (>50 per cent.); 2nd, gradual increase, up to the 30th minute, reaching 150 per cent.; and 3rd, slow, progressive drop, reaching 65 per cent. of normal within 2 hours. The narcosis also tended to change the ratio of free and loosely bound (with protein) adrenaline. The adrenaline was estimated by the quantity fluorescent method (modification of Frenkel, *Ukrain. Biokhim. Zhur.*, 23, 348 (1951).)

B. GUTOFF (Chem. Abstr.)

The Experimental Neuro-stimulating and Convulsant Effects of Theophylline and Some of its Derivatives. Mercier, G., et al. [Trav. soc. pharm. Montpellier, 9, No. 2, 14 (1949).]

The analeptic and convulsant effects of theophylline and some of its soluble derivatives have been determined and compared. The compounds used were the Na salt of theophylline (I), 7-(2-hydroxyethyl)theophylline (II), 7-(2,3-dihydroxypropyl)theophylline (III), theophylline ethanolamine (IV), and 7-(2-diethylaminoethyl)theophylline (V). Dogs under chloralose anesthesia were perfused intravenously with (I) to (V) at the rate of 1.6, 1.8, 2.0, 2.44, and 2.55 mg. per kg. of body wt. per minute, respectively. The total amounts administered were recorded at the moment of awakening, at the onset of mild irregular convulsions, at the onset of frequent convulsions, and at the onset of incessant convulsions. (III) produced no awakening from the anesthesia and no convulsions. (I), (II), (IV), (V) produced awakening after the mean administration of 27, 32, 21, and 20 mg., respectively; they produced irregular convulsions after the mean administration of 34, 57, 24, and 26 mg., respectively; and they produced frequent convulsions after the mean administration of 53, 90, 48, and 34 mg., respectively; (I), (IV), and (V) produced incessant convulsions after the mean administration of 85, 77, and 58 mg., respectively: (II) produced no incessant convulsions. In addition measurements were made of the mean percentage increases in respiratory rate and the mean percentage decreases in arterial pressure after the administration of 1 g. per kg. of body wt. of each compound. (I) to (V) produced, respectively, 150, 72, 42, 57, and 83 per cent. increases in respiratory rate, and 42, 10, 10, 32, and 18 per cent. decreases in arterial pressure. Stimulating and convulsant activities for these compounds increase in the following order: (II), (I), (IV), (V), indicating that OH groups in the side chain decrease activity while NH₂ groups increase activity.

CONSTANTINE J. GILLESPIE (Chem. Abstr.)